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STRATEGIC BUSINESS MODELS OF PLATFORM PROVIDERS IN THE VIDEO

GAMING INDUSTRY

Cloud Gaming Value Proposition Analysis

NATALIE REYHER

Work project carried out under the supervision of:

Ilya Okhmatovskiy

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Abstract

This Work Project examines the evolution and variation of business models within the Online Video Gaming Platform Industry. In the present paper, an in-depth analysis of the cloud gaming value proposition is provided. Accessibility, affordability, and simplicity are the strongest components of the cloud gaming value proposition and differ significantly from the value proposition of other business models within the industry. Further, specific advantages and weaknesses of the business model are outlined, and overriding recommendations are presented to strategically optimize this business model. To conclude, key insights and limitations as well as future research are discussed.

Keywords: Strategy, Business Model Innovation, Business Model, Video Gaming, Cloud Gaming Platform Providers, Value Proposition, Value Proposition Canvas, Cloud

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1 Introduction

Playing games on computers or other devices has been around since the latter half of the 20th century, developing from arcade games over home consoles to mobile and cloud gaming. Generating more revenue than the film and music industry combined, with an international worth amounting to more than \$197 billion in 2022, video gaming now constitutes the largest share of the entertainment industry (Mrkonjić 2022). In June 2022, there were a reported 3.24 billion video game players of all ages: more than a third of the world population (Gordon 2021). Video gaming exhibited constant and perennial growth in the last decade (Marchand and Henning-Thurau 2013), powered by rising mobile connectivity, significant growth in the smartphone market, and a surge in free-to-play games; developments which were further expedited by the COVID-19 pandemic. Recently, positive perceptions about video gaming are accruing, and outdated notions about their evil and unsocial nature are fading. During the pandemic, video gaming was linked to positive mental health factors, such as reduced anxiety and exacerbated stress levels (Paliwal 2022) and oftentimes facilitated the transition to distance learning (Gordon 2021).

But how come the video gaming industry is so successful, whilst other industries are struggling to adapt to the current times? For one, fast dynamics and innovation are inherent to gaming, as recent developments in cloud gaming, the Metaverse, esports, and NFTs underline. Most importantly, however, companies often fail to adapt their business model to changing environments. In the future, competition will no longer occur between products or technologies, but rather between business models (Gassmann, Frankenberger, and Csik 2014). Despite the breadth of research available on business models, scholars and practitioners do not share a unanimous view of the components, dimensions, or even definitions of the subject matter (Morris, Schindehutte, and Allen 2005). Nonetheless, common ground is found concerning the use of business models as a system-level, holistic unit of analysis, which

differentiates itself from the sole notion of a product, company, or industry (Zott, Amit, and Massa 2011). More specifically, the mission of a business model often lies in an understanding of the value creation and value capture of a firm, not only for itself but also for its stakeholders (Gassmann, Frankenberger, and Csik 2014).

1.1 Motivation

Entertainment is not only one of the most relevant industries in the world but also one of the oldest. “Bread and games”, or the original proclamation “Panem et circenses”, coined by the Roman satirical poet Juvenal (circa A.D. 100), emphasizes this sentiment. Engagement with entertainment is almost inevitable in our daily lives. Be it film, music, sports, museums, evening economy, performance arts, or video games, touchpoints accumulate quickly. Creativity and technological innovations are hallmarks of the industry, accentuating its future-centricity. This is reflected in the industries’ revenues of more than \$2.3 trillion in 2021, outpacing overall economic growth worldwide (PricewaterhouseCoopers 2022). Especially the video gaming industry evolved prominently, with around 40% of the global population playing video games at present (Mrkonjić 2022). This highlights the impact of video games, an expansion that was further accelerated especially in 2020 and 2021, where record-level growth occurred in terms of engagement and spending, pulling in many new and lapsed players. This massive growth is unlikely to be sustained, as fewer people picked up gaming in 2022, nonetheless, predictions are that the numbers of players will continually rise until 2025, with a five-year CAGR (2021-2025) of +4.2% (Newzoo 2022).

Aside from relevance and growth, the authors are ardent about new technologies and in turn, their impending possibilities. Considering breakthrough innovations, diversified business models, and major tech players competing over market leadership, the online video gaming industry presents a compelling direction for analysis. Likewise, cloud (computing)

technologies are developing immensely in recent years, lifting preconceived impositions of servers and hardware. Through the implementation of cloud technologies, businesses can adapt quicker, scale their innovations better and drive innovation and agility, thereby bringing the future to a company (Accenture 2021).

Finally, within the entertainment industry, subscription-based streaming services have revolutionized how music and video are consumed. Now, a market without Spotify or Netflix is difficult to imagine. With subscription-based offers entering the world of gaming, already labeled “The Netflix of Gaming” (Singer and D’Angelo 2020), the prevalent business models might change accordingly, hereby constituting another interesting aspect of analysis.

For all these reasons, and because the authors are particularly interested in the consulting and tech industries, the video gaming industry, and its recent developments are so worthwhile to be examined.

1.2 Scope

As the size of the industry extends the scope of the present paper, boundary conditions were applied. Within the video gaming industry, most sources identify five to six key players in the traditional value chain, including platform (and hardware) manufacturers, game developers, publishers, distributors, retailers, and consumers (BS and Prusty 2021; Kunnskapsverket 2017). However, these actors operate very differently in terms of their business models. To better elucidate the industry dynamics, the analysis is hence confined solely to the business model of the “middle-man” between game producers and consumers, namely the platform providers. The breakdown of the industry was performed to allow for ample categorization and differentiation between the business models. The industry's variation is exemplified by showcasing the four major business models for online gaming platforms,

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explicitly console gaming, digital distribution only, direct-to-consumer publisher, and cloud gaming. The in-depth analysis centers on the cloud gaming business model.

Additionally, in terms of game development and complexity, the focus of this project lies on PC and console games, not mobile games. The latter differs substantially in game design, industry players, and target group, which is why mobile-focused games are excluded from this analysis.

Furthermore, geographical limitations were imposed. This is due to the ease of comparison as there is a vast number of industry players worldwide as well as other differentiating factors, such as variations in monetization models and 5G roll-out. North America and Europe are the main markets at present revenue-wise, despite many users in Asia, with whom monetization remains difficult due to customization to the free-to-play model for mobile gaming (Interview 1 with Market Consultant at Newzoo, 2022). North America is the most promising market due to buying power; currently contributing the largest amount (i.e., a projected \$62 billion in 2022) to the global revenue of video gaming (Mrkonjić 2022). Additionally, the US has been the largest console market and the source of most of the innovations in gaming since the industry's beginnings (Huber 2022). Taken together, the North American market constitutes the focal point of our paper.

1.3 Structure

Due to recency, variation, and potential industry disruptiveness, the center of this paper is the in-depth analysis of the cloud gaming business model, focusing on cloud gaming platform providers (CGPPs). However, before its scrutinization, it is important to understand how this model emerged and evolved. For this purpose, (online) video game platform providers, within the video gaming industry are assessed, carving out their evolution and present variation. To that end, a variety of frameworks, tools, and gaming knowledge, gathered from interviews with

stakeholders, such as industry experts and gamers, are employed. A discussion of the assets and vulnerabilities of the present business model follows. On that basis, specific recommendations for business model improvement, as well as weakness mitigation, are derived and evaluated. Lastly, a conclusion is derived, alongside the limitations of this paper and directions for future research, to conclude the paper.

2 Methodology

2.1 Conceptual Background

The term business model first gathered momentum parallel with the rise of the internet in the mid-1990s and has since been of interest to scholars and business practitioners alike (Zott, Amit, and Massa 2011). Business models have been studied in various contexts, including e-business models, strategy, innovation, and technology management. Yet, exact definitions vary largely, nonetheless, some conceptual components have been agreed upon. Though used interchangeably by some in the literature, a distinction is commonly made based on competition. Business models do not contemplate competition, whereas in a competitive strategy, often mistakenly treated as a synonym of business model, everything revolves around how a company performs better than its rivals (Magretta 2002). But to truly innovate and create a new business model, one must stop looking at what the competition is doing (Gassmann, Frankenberger, and Csik 2014).

Somewhat analogous to the chicken and egg problem, the question remains of what comes first, the business model or the strategy. As pointed out by Magretta (2002), companies with similar business models may opt for different strategies. Casadesus-Masanell and Ricart (2011) on the other hand affirm that strategy instigates the plan about which business model to use in the first place. Despite the outlined unclarity and a lack of a commonly accepted definition, most authors agree on at least some of the components (e.g., Gassmann,

Frankenberger, and Csik 2014; Afuah 2014). More specifically, on four dimensions which comprise **external aspects** (references to (1) the customers and (2) value offered) and **internal aspects** ((3) key processes, an underlying (4) profit formula), whereas some authors developed frameworks with more subcomponents. A prominent example of this is the Business Model Canvas from Osterwalder and Pigneur (2010). With its nine elements, it constitutes quite an extensive unit of analysis with a strong theoretical division. However, the differentiation between these nine elements remains relatively difficult in practice, and the model further fails to consider upcoming trends (Becker and Daube 2018). The situation is similar to the business model framework of Johnson, Christensen, and Kagermann (2008) which identifies several subcomponents as well, and places heavy emphasis on the profit formula, thereby contrasting other frameworks.

Taken together, business models thus describe how companies generate, deliver, and capture value (Osterwalder and Pigneur 2010). They can hereby be understood as a tool for the depiction, innovation, and evaluation of business logic in industries (Veit et al., 2014). Thus, despite the lack of a unifying definition, the conceptualization usually occurs with considerable intersections.

The long-term competitive success of a company depends upon its ability to develop an innovative business model (Zott, Amit, and Massa 2011; Gassmann, Frankenberger, and Csik 2014) as value is oftentimes generated through disruptive, or revolutionary ones. This is because novel business models can become a source of competitive advantage (Markides and Charitou 2004) as they supersede the old way of doing things (Magretta 2002). For instance, the success of Netflix, reinventing video rental without owning a single physical shop, lends credibility to these claims (Gassmann, Frankenberger, and Csik 2014).

Taken together, the literature showcases that business models can take a pivotal role in tapping into the value potential inherent to new technologies, and in turn, their market

outcomes (Zott, Amit, and Massa 2011). Calia, Guerrini, and Moura (2007) highlighted that technological innovation can instigate changes in a company's operational and commercial activities, and in turn, the business model. All of this underscores the importance of business models and shows that the competitive advantage of tomorrow is based on companies' ability to innovate their business model today (Gassmann, Frankenberger, and Csik 2014).

2.2 Applied Approach

There are a variety of frameworks that can aid in understanding the dynamics of a business model. For this paper, the framework proposed by Gassmann, Frankenberger, and Csik (2014) was utilized, providing a comprehensive toolkit for the analysis of a business model. The main rationale behind this choice lies in its comprehensibility due to four dimensions, which simplifies applicability, yet the model is still exhaustive enough to obtain a clear picture of the business model architecture (Gassmann, Frankenberger, and Csik 2014) in contrast to others.

The sections *Who*, *What*, *How* and *Value* constitute these components, respectively. The first component, *Who*, defines the target customer. It outlines which segment(s) of the population the business wants to interact with and for whom value is created. Secondly, the *What* component describes the offerings of the organization and in turn, the value it creates for the customer. The *How* dimension explains the processes, activities, and resources necessary to make the offer available. For this part, the value chain is examined and consequently, how the value proposition is created. The fourth component inspects *Value*, and thus, how the business operates financially, by looking at the revenue model in terms of cost structure and the applied revenue mechanisms (Gassmann, Frankenberger, and Csik 2014).

In accordance with a variety of subcomponents, these four dimensions were further analyzed. Hence, the authors expanded on the Gassmann model and call this variation hereafter

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the Gassmann model extended. In the case of *Who*, different market segments were examined, including demographic, geographic, and behavioral components. Regarding *What*, Osterwalder and Pigneur's Value Proposition Canvas (2010) was applied, which unites the customer profile and the value map as two closely connected elements of analysis. As the model outlines specific benefits in relation to the industry, it goes beyond a mere description of services and products. In the next step, for the *How* part, the analysis was oriented toward Osterwalder and Pigneur's (2010) dimensions of types of key partnerships, resources, and channels and is structured accordingly. Finally, for reasons of exhaustiveness in terms of the understanding of the business models profitability, in the *Value* part, cost structure and revenue streams were considered, extending on notions of the Gassmann model which solely considers revenue streams.

Another framework employed is the Design Thinking method with its three evaluation criteria viability, desirability, and feasibility (Chasanidou, Gasparini, and Lee 2015). Implementation occurred to grant quantifiability to the recommendations and to rate them in terms of quality and applicability.

2.3 Sources of Data

As sources of primary data, the authors mainly worked with annual and company reports, company websites as well as interviews. Regarding the annual reports, they were usually publicly available on the respective websites, an example being Sony's annual reports. Furthermore, the authors operationalized industry reports, for instance, the free versions of Global Games Market Reports 2022 from industry experts such as the market research company Newzoo. An overview of these data sources is provided in the Figure 1.

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Overview of Annual and Market Research Reports		
Company	Report Title	Type of Report
Microsoft	Microsoft 2021 Annual Report	Annual Report (2021)
Sony	Corporate Report 2021	Annual Report (2021)
Newzoo	NEWZOO TREND REPORT Cloud Gaming: The Perfect Storm	Market Research Report (2018)
Newzoo	Cloud Gaming Market Report	Market Research Report (2022)
Newzoo	Newzoo Global Games Market Report	Market Research Report (2022)
Newzoo	Global Cloud Gaming Report	Market Research Report (2021)
Newzoo	How Consumers are engaging with games in 2022	Market Research Report (2022)
Newzoo	Key Insights Into American Gamers	Market Research Report (2022)
Fortune Business Insights	Cloud Gaming Market Size, Share & Covid-19 Impact Analysis, By Device, By Streaming Type, By End-User, and Regional Forecast, 2022-2029	Market Research Report (2021)
GWI	The Gaming Playbook	Market Research Report (2021)

Figure 1: Overview of Annual and Market Research Reports (Table by authors)

On top of that, primary data was obtained from a variety of industry expert interviews. Interviewee recruitment and execution occurred in the timeframe of November 11th until December 5th, 2022. Over 55 people of three categories were contacted, firstly through the personal network but mostly through active sourcing on the platform LinkedIn. The categories of contacted candidates contained employees of cloud gaming and gaming organizations, industry consultants, and frequent or professional gamers.

To find and identify these industry experts, different keywords were employed in the search, such as “Cloud Gaming”, “Xbox Cloud Gaming”, “Google Stadia”, “PlayStation Cloud Gaming”, and “Gaming Industry”. Based on LinkedIn profiles and company affiliation, suitable candidates were identified and a draft message, explaining the purpose of our research and the wish to conduct a semi-structured interview, was sent. Before the interview, informed consent was obtained. In total, nine positive answers were obtained, wherefrom five interviews were conducted in person via a video call, and four answers were gained in written format. Interviews were conducted in English.

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Interviews were conducted in a semi-structured manner with open questions, tailored to the expertise of each interviewee. The interviews averaged around a length of 30 to 45 minutes. In the end, interviewees could indicate whether they were interested in obtaining this paper. Transcripts of the interviews were generated according to an adapted version of simple transcription by Dresing and Pehl (2010) and are attached in Appendix 1 to 9. Due to the request of certain interviewees for anonymity, and to achieve conformity, all names of the interviewees were removed from the transcripts and only the position, gender, and a brief company description as well as approximated age were included, which are summarized in Figure 2.

Overview over conducted interviews

Interview	Interview Partner	Company Description	Gender	Age approx.
1	Market Consultant at Newzoo with overall lead of the cloud gaming section	Newzoo offers games data products and services reaching from in-depth games tracking to gamer research as well as consulting	Male	25 - 30
2	Senior Business Development Manager at Tencent Cloud	Tencent Cloud is the Cloud division of Tencent, a Chinese multinational technology and entertainment conglomerate	Male	50 - 55
3	Gaming industry manager at Google	Google has its own games division called Google Play Games and launched the cloud service Google Stadia which will be shut down in January 2023	Male	35 - 40
4	Frequent gamer and IT bachelor student	-	Female	27
5	Founder and CEO of Business in Games	Business in Games (BIG) is a Gaming Strategy and Marketing firm	Male	40 - 45
6	Senior Software Engineer Xbox Cloud Gaming	Xbox Cloud is Microsoft's own cloud gaming service	Male	45 - 50
7	Chief marketing officer at AirConsole	AirConsole is a global cloud gaming service	Female	30 - 35
8	Senior Hardware Engineer at Sony PlayStation	Sony Playstation has its own cloud gaming service integrated into the PlayStation+ Premium subscription	Male	35 - 40
9	Core gamer	-	Male	24

Figure 2: Overview of conducted interviews (Table by authors)

2.4 Sources of Ideas

With regards to secondary data, websites, books, internal records, and journal and company articles were consulted. The secondary data used can be divided into three categories. First, online searches of various databases such as Google Scholar and Semantic Scholar were conducted. Keywords included gaming-related terminology such as “Gaming”, “Cloud Gaming”, “Cloud Gaming Monetization”, and “Business Models Video Gaming” as well as research related to the theoretical and analytical frameworks, such as the Gassmann model, the

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Value Proposition canvas, Design Thinking, and insights into the business model literature.

The search was conducted in a snowball procedure to gain an exhaustive overview of the industry dynamics. Secondly, websites and blogs from industry experts, gamers, and company websites were used. Thirdly, various observations were extracted from company articles by consulting firms such as Kearney (i.e., Is cloud gaming at the tipping point?) and Bain. These insights and ideas were subsequently scrutinized, processed, and arranged in a structured manner to subtract clear insights.

3 Business Models in the Video Gaming Industry

To generate a thematical foundation for the industry, the evolution of the business models in the gaming industry is illustrated in the next step and further the current variation of them is explicated.

3.1 Evolution

“Business modeling is the managerial equivalent of the scientific method – you start with a hypothesis, which you then test in action and revise when necessary.” (Magretta 2002, n.p.). The author further states that in some way, all stories (using the analogy of comparing the creation of a new business model to the act of writing a new story) are adaptations of old ones: new business models are variations on the generic value chain underlying all businesses. The following part is, thus, aimed towards showcasing the evolution of business models in the online video game industry, with an emphasis on video game platform providers. This serves as a starting point for understanding its dynamics, before providing an overview of the present variation of models within.

With advancements in computing and a trend towards gaming in the middle of the last century, the 1970s were a formative period for video games, with the first arcade game, Pong, coming into play in 1972 and the release of the first home console in 1977 (HistoryDegree 2017). Ever since the onset of video gaming, rather large evolutions have transpired, with the industry exhibiting one of the most rapid business model shifts in any entertainment art form. Above all, the transition from games as a finished product to games as a service embodies the most prevalent change of the last 50 years (Toyama, Mauro, and Côtés 2021), a gradual evolution, which is outlined in the following.

In the industry’s infancy, arcade games were one of the very few options that instigated a feasible business model around video games (Sandqvist 2015). The costs to purchase one of

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the machines on which the games ran on, were too high for an individual person. Hence, arcade machines were rented to commercial institutions and exhibited in shopping malls and gaming centers worldwide, which in turn sold the chips/coins necessary to activate them, to customers. By sharing the operating costs of the machines between customers, gaming became affordable for players but simultaneously remained profitable for the owner (Sandqvist 2015). Yet, customers neither owned the games nor did they have the possibility of playing them at home, a visit to the arcade was a necessity to play games on machines in exchange for money.

Fast leaps in technology soon allowed for the creation of the first home console. In the first generation, the platform providers oversaw the development of the hardware and software, due to the unavailability of removable game cartridges at that time. Like this, people were only able to play a single game on their home console. During the design process, it was initially the goal of the developers to duplicate the arcade experience, something that did not resonate too well with the customers (Higgins 2020). However, removable cartridges surfaced in the very same decade and along with the introduction of cheap home computers, a new era of gaming was ushered (Sandqvist 2015). The components necessary for gaming were continuously contracted in size, thereby paving the way for handheld consoles (Higgins 2020). People were now able to play games at home, without being limited to a single game after a one-time purchase.

However, this advancement quickly resulted in the entry of a multitude of new companies that saturated the market with new games. The overproduction of games without a fun factor and the simultaneous lack of new consoles let the customers slack in interest, which yielded an industry crisis in the early to mid-80s (Kline, Dyer-Witthof and de Peuter 2003; Sandqvist 2015).

To counteract this predicament, the predominant business model within the industry quickly adapted. Up until the early 2000s, the focus laid on selling physical copies of games

and consoles. Rayna and Striukova (2014) referred to this business model as “few to few”. Here, only a few games were produced for consoles and PCs. These games were the so-called “boxed games”, that were retailed through distributors to only a few consumers because of their high price. During that period, games could be purchased in shops, which is why gaming businesses were intensely competing over the limited shelf space at the retailers (Sanqvist 2015). So much so, that manufacturers often incurred losses as they were selling their consoles cheaper than the production costs. That way, profits for manufacturers were only realized through the licensing fee they received from every game sold for their console (Sanqvist 2015).

The introduction of the smartphone revolutionized the industry in the early 2000s, as the mobile gaming market quickly took off and overhauled PC and consoles in terms of revenues (Wijman 2018). This change was inevitably connected to the rise of the internet, the expansion of reliable infrastructure, and novel access to games (Dillon 2013). Becoming popular at the turn of the century, these online games could be accessed through a monthly subscription, moving away from one-time purchases and towards a consistent revenue stream for developers. Moreover, features and in-game microtransactions became available so that players could spend real money online by buying and selling virtual items, through which, a new gaming ecosystem was established (Dillon 2013). By moving away from the idea of boxed games and the increasing inclusion of players in game development, the development pipeline began to change.

Furthermore, the progress of digitization resulted in more digital distribution and the consolidation of online stores and platforms, and platform providers’ ability to lock in consumers and developers (Sandqvist 2015). This was the case because consumers purchased more games on one platform for this platform, and their friends were doing the same, which incentivized them to continue this practice into the future. To exemplify, one may look at android and iOS users. If a prior android user switches to an iPhone, the games they played

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before might not be available in the AppStore or on Apple products in general, thereby increasing switching costs (Sandqvist 2015). Sandqvist (2015) further explains how developers get locked in by similar means, as some platform providers and compatibility requirements make it impossible to play the same version of a game on a different platform without the costly adaptation of a game.

Some years later, the “few to few” business model gradually innovated towards a “many to many” approach. As the name implies, within this model, many game developers created several games for different devices, which were in turn distributed via various channels (e.g., social media platforms, smartphones, PC, connected TVs, etc.) for a rather low price and to many customers (Rayna and Striukova 2014). With the inclusion of the internet, the consolidation of the sale of downloadable content (e.g., the download of a new character or a new mission) was made possible (Costa, Toyama, and Rocha Côrtes 2021). That way, the lifespan of a game had been extended, as through updates, new content can be added continuously. These advancements turned games into increasingly open-ended experiences, offering consumers thousands of hours of entertainment (Singer and D’Angelo 2020).

Further, the relationship between the gamer and the game changed, in terms of how the games are used (when, where, how long, etc.; Wilhelmsson et al. 2022). Games are not necessarily linear forms of entertainment anymore with a clear beginning, middle and end. Rather, the game engagement began to shift towards infinitely playable “loops” with continuous new quests or the goal to improve (Singer and D’Angelo 2020) in such ways that post-launch activities and game development processes continue after the game release (Wilhelmsson et al. 2022). In sum, now only pieces of content were released in contrast to finished games. With this, the first step towards Game-as-a-Service (GaaS) and away from Game-as-a-Product (GaaP) was completed (Costa, Toyama, and Roca Côrtes 2021; Wilhelmsson et al. 2022).

Derived from the Software-as-a-Service (SaaS) model, GaaS constitutes a new monetization mechanism within the video gaming industry (Stefanidis 2020): increasingly involving a free-to-play option, a continuing revenue model is nonetheless set up through in-game microtransactions (e.g., purchase of virtual goods) or downloadable content. With this recurring income, complete virtual economies are created within several games. During that time, the subscription model also gained momentum (Cook 2018). Within this model, access to video games was granted through a subscription fee that had to be paid by the consumer, oftentimes monthly or yearly.

The newest evolutionary step in terms of business model innovation is the new ventures into the realm of cloud gaming (Costa Toyama and Rocha Côrtes 2021). Completely emerging in the GaaS model, due to the ceasing need for specific hardware, games are streamed onto any device that is already in possession of the consumers, which significantly reduces the upfront costs for the user. GaaS signals a shift from a studio-centric model towards a player-centric model, that increasingly considers recurring revenues, player retention, and iterations (Wilhelmsson et al. 2022). With the game platform as a content provider, the service feature is further amplified. Several of the large hardware platform holders, be it Microsoft, Apple, Sony, or Google have ventured into subscription-based business models, where online playing, as well as a library of content, are available through a recurring fee (Wilhelmsson et al. 2022).

In addition, large platform holders are now increasingly acquiring game developers themselves as well as hosting game creation tools, game engines, and distribution platforms in-house, showcasing that the market is consolidating. The increase in subscription services within gaming, as offered by different game-distribution services such as Microsoft and Nvidia, caused a power shift from game studios and publishers to a few digital distribution giants with massive scale and market share (Singer and D'Angelo 2020).

Bearing in mind these developments, Microsoft's CEO of the gaming division, Phil Spencer recently said "... I fundamentally believe a strength for us in the video game business is the diversity of business models and strength of those." (Kerry 2022, n.p.). The next section is thus aimed toward an overview of the variation that is currently present within the business models.

3.2 Variation

During the last decade, many ways to play video games on online platforms emerged. The most dominant business model has been console gaming, making up 55% of the market (Gilbert 2020). PC gaming, spanning a long history, is the most popular alternative, with cloud gaming on the rise as a new way to play AAA games. To further specify the different types of business models in the industry, the authors identified five pillars that are crucial components of the variations in the market:

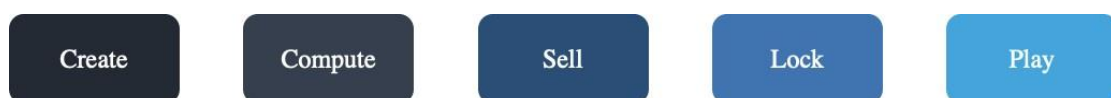


Figure 3: Five Pillars of Gaming Platforms (Derived from literature review)

The first pillar, *Create*, describes the creation and development of video games and more specifically, content creation and publication on platforms (Jöckel, Will, and Schwarzer 2008). The delivery of excellent content is one of the main success factors for platforms to generate demand.

Game development has two main players, (1) game studios and (2) publishers. Game studios are comprised of developers who turn a concept or idea into a playable game, while publishers provide know-how, "publish" and monetize it later in the process. (Gaming Street 2019). Publishers either own game studios or publish games from external studios (Dilmegani

2022). Platform providers can also act as publishers and own game studios that exclusively produce content for their platform. The conventional way, however, is for those platform providers to form agreements that allow games from external game studios and publishers to be accessed through the platforms (Ojala and Tyrvaïnen 2011). Content can be categorized into different tiers, such as “Indie games”, low-budget productions by independent developer groups, and “AAA games”, capital-intensive large projects which aim for a high ROI and are backed by capital from large publishers (Wallace 2022). AAA games often end up as popular franchises and make up the biggest amount of revenue for platforms (Karthikeyan 2021). They are, thus, refining the quality of the platform. Indie games are significantly smaller in scope and cost, focus on a niche, and can be used to add quantity to a platform.

Content can either be distributed through partnerships with platforms or be produced exclusively for one platform. The advantage inherent to partnered distribution is that revenue is generated through multiple channels (Marchand and Hennig-Thurau 2013). The game is sold through different platforms; these then earn royalty fees for offering the distribution network to the publisher (Doshi et al. 2022). For platforms, royalties are a major income source (i.e., 15%; Doshi et al. 2022), but there is no incentive for the customer to choose one platform over another with this kind of content strategy. Conversely, if games are created exclusively for one platform, content can become a core value proposition and differentiate platforms from competitors.

The second pillar, *Compute*, refers to the technical computing of the game that enables its display on a screen for the end-consumer. Traditionally, computing is executed by hardware on the consumer side, meaning consoles or PCs are mass-produced, shipped to customers, and then used to compute games locally on the consumer side (Rao 2021). The main components to compute video games are Central Processing Units (CPUs) and Graphics Processing Units (GPUs). The processor market is an oligopoly, with Intel and AMD dominating the CPU

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market (Statista 2022) and Nvidia dominating the GPU market ahead of AMD, as well as the new entrant Intel (Dow 2022). Apple is another player, but their chips used on non-Windows devices are not geared toward gaming.

Chip manufacturers are a central player in the video game industry, as they control bargaining power over platform providers as well as customers. Due to the oligopolist nature of the market, competition is lower than in highly competitive ones. Chip manufacturers can charge high margins, as their business is rare and hard to imitate, and demand is usually higher than supply, as was displayed in 2020's price hike (Newzoo 2022). Implying for platform providers, that computing tech is a crucial pillar in building the business model, as the most popular AAA games require the highest quality computing chips. Thus, strong indirect network effects can be observed, as better technology for platforms increases the attractiveness of the games offered on the platform (Marchand and Hennig-Thurau 2013).

The third pillar, *Sell*, refers to the provision of a marketplace for the video games to be sold on. This pillar describes the e-commerce of video games. Marketplaces can be out-of-platform, like Amazon selling video games on their store, or in-platform like Sony selling games for their PlayStation console through their PlayStation Store, or Valve selling games through the Steam app for Windows and Mac PCs. Providing a marketplace is not mandatory for a business model in online gaming platforms, yet it can be an asset for several reasons. First, it removes barriers between platforms and creates a seamless experience. Any barriers that could result in friction and loss of the customer from one touchpoint to the next are detrimental to the success of the platform. Further, it removes intermediary distributors who chop off parts of the margins and eliminates the possibility to resell games, thus increasing the sales prospects of new games for full price (Marchand and Hennig-Thurau 2013). Marketplaces also act as drivers for switching costs. With games being bought on a platform instead of externally, they are only valid to be played on that platform (Newzoo 2022). Players might accumulate a high number of games

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and must stick to that platform to be able to continually play them. However, marketplaces are not present in all online gaming platforms. For some services, it might make sense to only focus on the other pillars and act as an open platform allowing games to be bought elsewhere, as this increases the number of potential customers and lowers entry barriers.

The fourth pillar, *Lock*, provides the end-user hardware, like a classic video game console or handheld device. Providing a physical device to the end-user which is combining computing technology with product design is at the core of most traditional business models in gaming. The added value relies on integrating the outsourced processing chips into a fully working device which consumers can acquire and use to play games. The device is subject to a considerably high one-time acquisition cost and is often sold at a loss, like in a razor-and-blade business model (Daidj and Thierry 2009). Such device also requires additional input devices (“peripherals”) like a controller, mouse, and keyboard. Consequently, customers are tied to a device creating high barriers for new entrants, as well as high switching costs. Locking a customer into a hardware choice was long seen as the way to go for gaming platforms but might soon be overthrown as will be explored in the next chapters.

The fifth pillar, *Play*, provides end-user software and an application execution environment (Ojala and Tyrvaïnen 2011). This pillar is core to all online gaming platforms, as it defines the customer access point for previously acquired games, through the platform as a service (PaaS). The end-user software can be exclusive to certain hardware like a console, or an application that can be installed on several devices like Valve’s Steam or Amazon’s Luna. If the end-user software is integrated into end-user hardware and/or the marketplace, synergies are present. For example, transitions between buying a game and playing it are smoother if the customer does not need to switch platforms, adding to convenience and eliminating jump-off points.

Overall, these five pillars can be combined in any way to create a unique business model in the online gaming platform realm. To stay inside of the scope of this paper, the fifth pillar,

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Play, is mandatory for online gaming platforms. The other four pillars might be either core, optional, outsourced, or not part of the business model at all. By combining the five pillars, we identified four major business models for online gaming platforms: (1) Console Gaming, (2) Digital Distribution Only, (3) Direct-to-Consumer Publisher, and (4) Cloud Gaming.

Business Model	Cloud Gaming	Console Gaming	D2C Publisher	Digital Distribution Only
Brief Description	Option to fully integrate all steps in the value chain, alternatively focus on compute and play.	Lock customers in hardware-driven ecosystem, razor & blade monetization, outsource processing chips.	Use platform to play own games from own game studios only, not involved in hardware steps.	Accumulate network of games to sell & launch games for seamless customer experience across publishers.
Create: Publish games	optional	optional	core	
Compute: Develop computing technology	core	outsourced		
Sell: Provide Marketplace	optional	optional	core	core
Lock: Provide end user hardware	optional	core		optional
Play: Provide end user software	core	core	core	core

Figure 4: Overview of Business Model Variation (Table by authors)

3.2.1 Console Gaming

The console gaming business model is one of the most prominent traditional business models in video gaming. It is based on a closed, vertically integrated environment (Marchand and Hennig-Thurau 2013), consisting of a unique user interface to access games, end-user hardware in form of a gaming console with a controller as a peripheral, a marketplace that is integrated into the software, outsourced hardware components, and both third-party and exclusive content.

The classic gaming console is the closest a gaming business model got to featuring a fully integrated value chain with controlling every step of the value chain other than the computing chips. These are outsourced from chip manufacturers like AMD, through partnerships (Gordon 2019). Chip manufacturers enjoy high bargaining power, as console producers like Sony (PlayStation), Microsoft (Xbox), or Nintendo (Switch) are dependent on

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their chips to make consoles attractive options for consumers interested in playing AAA games. If the consoles' chips are not powerful enough, the content will lose its attractiveness and network effects will be diminished. Due to the high demand for processing chips, manufacturers can sell their chips to individual consumers with higher margins if console manufacturers do not offer high enough prices (Molloy 2021).

Regarding content, consoles mostly rely on third-party content from large publishers like Electronic Arts, Activision Blizzard, or Ubisoft. Due to the large userbases on consoles (Statista 2021), they are attractive destinations for publishers to offer their games on. Publishers pay royalties to console manufacturers to offer their games through their consoles, yet their massive user base outbalances these costs. Alternatively, console manufacturers possess their own game studios and produce exclusive titles to increase their platform attractiveness. Blockbuster games are used to lock customers into specific consoles since the games cannot be accessed elsewhere. "Single-homing" platform-exclusive games, however, reduce the sales potential of the game, compared to "multi-homing" (Marchand and Hennig-Thurau 2013). Nevertheless, this loss is worth it if the game sells consoles, and consequently more future games on it.

This is due to the fact that consoles apply a razor-and-blade business model. Consoles are sold at a loss but game sales revenue offset these losses in the long term (Kakabadse and Kakabadse 2005). Further, console platform providers charge monthly fees for online services (PlayStation n.d.) resulting in another huge income source, as a large part of gamers play online. Once customers have purchased the console, they are expected to be locked onto the platform for many years. Lock-in can also outlast console cycles which usually last five to seven years because players want to stay on the platform for the community they built there (Newzoo 2021).

Console platforms also use downward compatibility, allowing access to games from older console generations, to retain customers on the platform. After a console's technology is outdated, a new console will replace the old one (Marchand and Hennig-Thurau 2013). Players must make a new investment to still keep playing the newest blockbuster titles.

Consoles, since moving to digital distribution, also offer a marketplace inside their end-user software. Consumers can still buy physical games through traditional retailers, but most revenues are generated through digital sales on their platforms (Barbour 2020). Console platforms can obtain higher margins as they lose the intermediary and eliminate the resale of physical copies. The nature of consoles, as closed ecosystems, also allows them to charge higher prices, due to a lack of alternatives for the consumer.

3.2.2 Digital Distribution Only

All business models chosen for this variation part entail the digital distribution of online video games. The difference when analyzing Digital Distribution Only as a business model is a focus on vertical integration, i.e., the distribution of games. The added value can be summarized as social services, aggregation services, and security (Jöckel, Will, and Schwarzer 2008). Games are aggregated from publishers and independent game studios to generate revenues through royalty fees and benefit from large network effects (Giant Bomb 2021). Consumers purchase a license for games through online distribution platforms and then download the games to their own devices (Giant Bomb 2021). Security is added through digital rights management by the platform (Jöckel, Will, and Schwarzer 2008) The most popular example of mainstream digital distribution is "Steam" providing customers access to a continuously expanding library of games (GameSync Consulting 2021).

The pillars *Create* and *Compute* are not directly integrated into the Digital Distribution Only business model as platform providers mainly act as distribution platforms for games (*Sell*)

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and to make them playable for users (*Play*). Nevertheless, optionally platforms may choose to take up larger parts of the value chain by integrating business models such as crowdfunding for the *Create* pillar, like the platform Steam with its “Steam Greenlight” program (Tran 2014).

Core to their business model, digital distribution only platforms serve directly as marketplaces (*Sell*) as users pay for subscription tiers or complete one-time purchases to access and download games (Tran 2014). To exemplify, the platform Steam offers 30.000 games for sale (Steam 2022), has agreements with over 2000 game developers (Video Game Insights 2022), and has great market power over them due to its large customer base and resulting network effects. As the main income source of digital distribution only platforms, publishers need to pay royalties for game sales but also benefit from network effects, which incentivizes both sides to act in the same interest.

Continuing with the pillar *Play*, similar to D2C Publisher and Cloud Gaming, games are accessed via web apps of the platforms, and most also offer the service to save a user’s game in the cloud to allow for seamless gaming across devices.

Regarding the pillar *Lock*, adequate end-user hardware is necessary for this business model as all games need to be downloaded first and hence are directly played on the hardware of the end-user device (Giant Bomb 2021) but digital distribution only platforms do not offer/sell specific end-user hardware themselves nor lock users into a specific device.

In 2013, Xbox also tried to enter the digital distribution only market and adopt the Steam model but with no success as consumers saw the implementations as restrictions rather than improvements (Tran 2014). Consequently, when switching between business models, companies need to be careful that the design of the implementation ensures that (perceived) advantages for customers outweigh possible disadvantages, which was not the case for Xbox who canceled the changes shortly after their release (Tran 2014).

3.2.3 D2C Publisher

A “Direct-to-Consumer” business model is new to the gaming business, which long relied on brick-and-mortar retailers or digital distributors to act as an intermediary between game publishers and consumers. Currently, publishers, most prominently Activision Blizzard, Electronic Arts, and Ubisoft, use less closed-off platforms (console & digital distribution-only) which sell games from multiple publishers to gamers, to benefit from network effects.

However, to generate higher margins from the value chain, publishers explore selling directly to the consumer without any intermediary. Consequently, this model is very similar to the Digital Distribution Only Model, but here, publishers adopt a larger role within the value chain, as they provide the marketplace and platform for the games. The trade-off is lacks network effects, but no royalties need to be paid in return. Further, publishers have a greater power to integrate digital add-ons, like Electronic Arts’ EA Play subscription service.

As it is core to their business, publishers create and finance the games available on their platform, even though some competitors, like Epic Games, also explore the option to offer games from other publishers through royalties and compete closer with Digital Distribution Only services (Dutton 2011). This practice allows to raise the attractiveness of their platform and lure customers towards their blockbuster games. Additionally, some platforms adopt an open business model by integrating users into the development process of games (Gassmann, Frankenberger, and Csik 2014, p. 231). For a reduced price, some games are then sold at an early stage, offering gamers the opportunity to become part of the still-evolving game and providing feedback for developers (Höglund 2014).

The D2C Publisher Model is solely focused on software, pillars like *Compute* and *Lock* are left to other players in the value chain.

3.2.4 Cloud Gaming

Cloud gaming is defined as: “the ability to play a game on any device without owning the physical hardware required to process it or needing a local copy of the game itself. Also called game streaming, the games are processed remotely on cloud or edge servers and streamed directly to a user’s device.” (Newzoo, 2022, 14). Thus, games can be played on demand, everywhere, and across devices, and the computing power requirements are shifted away from local hardware and to a client-server model toward remote data centers into the cloud (Wierzbitzki, Tybus, and Firth 2021).

Cloud Gaming differs from the other three analyzed business models in terms of technology as the gaming activity is performed on the provider’s hardware (servers) and not on the user’s hardware (Campbell 2022). Hence, cloud gaming can be seen as an innovation in the distribution of gaming (Rao 2021). For the pillar *Compute* this entails high requirements to the platform providers as very powerful servers, integrated as a service into the platforms, are needed to guarantee a seamless gaming experience for users.

Continuing with the pillar *Sell*, CGPPs either offer games directly on their platforms via either a subscription model or one-time purchase, or they only sell the cloud gaming service itself, allowing users to bring their previously purchased games to stream them (Roach and Parrish 2019). The main differentiation lies between Bring Your Own Game (BYOG) companies which only offer the processing capacity itself, and Cross-Device Gaming + Games (CDGG) companies which offer the processing capacity and games (Rao 2021, Appendix 10). Thus, providing a marketplace is optional for cloud gaming even though most CGPPs do so.

The pillar *Create* is optional, as cloud gaming platforms do not rely on creating content but acquire it from external publishers. However, acting as an important driver of customer satisfaction (Interview 2 with Senior Business Development Manager at Tencent Cloud, 2022), platforms that own game development studios may opt to create exclusive content (Xbox 2021

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; PlayStation 2021). So far, no games have been created solely for cloud gaming purposes but rather for their general gaming libraries while cloud gaming is just one way to launch them, other than their consoles.

Concerning the pillar *Lock*, hardware is no more used as lock-in in that context as games can be accessed from generally all devices that are Internet-ready. Nevertheless, Logitech, as well as Razer, designed cloud gaming handheld devices (Logitech 2022; Razer 2022) and Google the Cloud Gaming Chromebook (Google Chromebook 2022) which all can be seen as add-ons but not as pre-condition for cloud gaming.

As previously mentioned, the fifth pillar *Play* is essential to all video gaming platform providers and hence also to cloud gaming. Users need to connect with the cloud through web apps of the CGPP which are compatible with almost all devices (PC, console, mobile devices) (Roach and Parrish 2019).

4 In-Depth Analysis Cloud Gaming Business Model

The primary aim of the forthcoming analysis is to provide a comprehensive understanding of the components of the cloud gaming business model. An overview of cloud gaming was provided in the variation, which is now followed by a brief historical excursus and some key figures. Afterwards, the cloud gaming business model components are scrutinized. The origins of cloud gaming date back two decades, when Finnish cloud gaming producer G-Cluster was the first to attempt the production of cloud games (Ojala and Tyrväinen 2011). Other game and software developers, such as Crytek, explored the option of cloud gaming in the mid-2000s, however, back then, concerns remained regarding economies of scale (Guilleminot 2022). Further ventures into cloud gaming, for instance by OnLive and Gaikai, were eventually sold to Sony (Zadtootaghaj 2022), who incorporated the technologies into their PlayStation Network. By doing so, they were able to introduce the PlayStation Now, which was the first game-streaming service available from a “traditional” console manufacturer (Parrish and Roach 2019). Problems of these early ventures mostly pertained to bandwidth (i.e., ability to handle many connected devices at the same time) and latency (i.e., time it takes for a connected device to make a request to a server and obtain a response) issues (Duffy 2020).

Since 2019, cloud gaming has found its footing in the games market and is believed to be on track for remarkable growth in the coming years, with market revenues amounting to \$1.6 billion in 2021 (Newzoo 2022), a figure which is projected to grow to \$40.80 billion by 2029 (Fortune Business Insights 2022). An overview of the existing B2C cloud gaming companies is provided in Appendix 11. Especially in the North American market growth is evident, a development which is driven by people’s buying power, strong economic backbone in the region, as well as cutting-edge technologies (Newzoo 2022).

4.1 What

4.1.1 Theory

In the second dimension, *What*, the value proposition of the business model for the customer is described, specifically, what is offered to the customer and what the customer values about the product (Johnson, Clayton, and Kagermann 2008). According to the Business Model Navigator, a value proposition is supposed to answer the five following questions: (1) “What customer problem are we attempting to solve?”, (2) “What customer needs do we try to satisfy?”, (3) “What segment-specific products and services do we offer our customers?”, (4) “What value do we generate for our customers?”, (5) “How does our value proposition differ from that of the competition?” (Gassmann, Frankenberger, and Csik 2014, p. 55). From a holistic point of view, *What* comprises the bundle of products and services offered by a specific company, which are valuable for the customer for specific reasons (Osterwalder 2004).

To analyze the value proposition of cloud gaming, the Value Proposition Canvas from Osterwalder and Pigneur (2010) is used as the underlying structure. All five questions raised in the Business Model Navigator regarding the value proposition will still be answered by following a different and more modular structure. The Value Proposition Canvas consists of two main elements which relate to one another: (1) the customer segment or profile, and (2) the value map (Osterwalder and Pigneur 2010).

The **customer segment or profile** elucidates who the customer is in terms of what gains, pains, and customer jobs he or she possesses (Osterwalder and Pigneur 2010). As the customer segment has already been analyzed and specified in the previous *Who* part, no further analysis or description of cloud gaming customer segments will be included in this section.

A **customer job** is defined as a task to be performed or a need to be satisfied by the customer (Osterwalder and Pigneur 2010). By identifying customer jobs also question (2) “What customer needs do we try to satisfy?” can be answered (Gassmann, Frankenberger, and

Csik 2014, p. 55). Hence, a customer job can be seen as a description of the purpose a customer has to use a specific product or service. Customer jobs usually depend on a certain context and are classified as either functional, social, or emotional. Functional customer jobs relate to specific tasks that need to be performed (e.g., cleaning the house), whereas social customer jobs refer to the status, power, and appearance within a group or community, (e.g., conveying an idea of success towards fellow human beings). Emotional jobs, on the other hand, are linked to the intrinsic need of feeling good and secure (e.g., feeling healthy after the consumption of sweets) (Osterwalder and Pigneur 2010).

Customer gains and pains are directly connected to customer jobs concerning what added value or mitigated negative effect the use of the product/service provides (Osterwalder and Pigneur 2010).

Customer gains are concrete benefits the customer seeks to obtain through the usage of the product/service (Osterwalder and Pigneur 2010). Like customer jobs, customer gains are classified into either functional, social, or emotional. Referring to the prior mentioned functional customer job of cleaning the house, the functional gain, in that case, could be a product that more efficiently removes dirt. Further, a social gain in the context of the social customer's job of demonstrating success could be a product that indicates prestige. Moreover, in the context of the emotional customer's job of feeling good, a product that makes the customer feel good when eating it could apply, as in the case of eating sweets.

Customer pains are related to the question of what possible risks or bad outcomes are associated with customer jobs (Osterwalder and Pigneur 2010). A classification into functional, social, and emotional can be performed. By identifying customer pains, question (2) “What customer problem are we attempting to solve?” is being answered (Gassmann, Frankenberger, and Csik 2014, p. 55). Referring to the functional job of cleaning the house, a functional pain could be that vertical vacuum cleaners usually fail at absorbing larger dust particles. Conjointly, a social pain related to demonstrating success could be that nonprofit institutions might refuse

to work with a person wearing expensive jewelry. Continuing with emotional pains, eating sweets might make the consumer happy while eating them, but the consumer could feel guilty about it afterward.

The **Value Map**, on the other hand, illustrates how value is created for the customer by building upon gain creators and pain relievers, as well as by explaining the type of product or service offered (Osterwalder and Pigneur 2010). The Value Map also answers questions (3), (4), and (5) of the *What* checklist (Gassmann, Frankenberger, and Csik 2014, p. 55). Listed products and services can be categorized into one of four categories: tangible, intangible, digital, and financial (Osterwalder and Pigneur 2010).

Deriving from the pain points that customers experience, **pain relievers** can be presented (Osterwalder and Pigneur 2010). Pain relievers describe exactly how services and products can ease specific customer pains when completing a customer job. By asking explicit questions the specific pain relievers of a product can be identified. Such questions could be: “Does the product/service make the customer save money, time, or effort when using it?” Or “Does the product/service remove obstacles that would have prevented the customer job from being completed?” (Osterwalder and Pigneur 2010).

Furthermore, **gain creators** are built upon customer gains, and explain in what way products/services are beneficial for customers when performing their customer jobs (Osterwalder and Pigneur 2010). Afresh, specific questions help to identify these: “Does the product/service exceed expected performance or is lower in price than expected” or “Does the product/service make the customer feel happy” (Osterwalder and Pigneur 2010).

All mentioned components should in the end be put together to illustrate the entire Value Proposition Canvas. It is important to note that products/services should possibly be adjusted to ensure that the value proposition aims at targeting important customer jobs, creates gains, and relieves pains for customers (Osterwalder and Pigneur 2010).

4.1.2 Cloud Gaming Value Proposition Canvas

The Value Proposition Canvas is now applied to the cloud gaming industry, specifically to the digital service of streaming video games via cloud gaming platforms. It must be noted that customer jobs will sometimes be presented in a more general way, as only functional jobs can be related directly to cloud gaming whereas social and emotional ones are rather gaming generic but not cloud gaming generic and hence apply to all forms of online video gaming. Further, there will be no focus on a specific gamer type within cloud gaming to demonstrate the full bandwidth of options cloud gaming has to offer for all of its customer segments.

First, **customer jobs** need to be identified for cloud gaming users. Starting with functional customer jobs, the main task is simply getting access to games. Further, social customer jobs are becoming part of the gaming community and/or reaching a certain status within it. Emotional customer jobs arise from the need to feel enjoyment through playing video games while also reaching higher game levels and hence feeling the sensation of progressing and succeeding. In addition, also the joy of spending quality time with friends while playing with or against each other and feeling like part of a group, of the gaming community. Customers could also feel the need to take a break from reality as well as to experience something new (gaming as a new experience for non-gamers as well as new games and ways how to game for casual, regular, and core gamers).

Moving on with **customer gains** and evaluating them on the prior mentioned potential customer jobs, functional gains related to the use of cloud gaming platforms are quick, cheap, and easy access to a great games library by streaming from wherever and to whatever device.

Social customer gains refer to connecting a gamer with other gamers through one platform where they then are offered the opportunity to socially connect, interact and integrate into the gaming community. Moreover, a platform that makes the game level status in some way visible to others, allows a gamer to demonstrate his or her hierarchical status within the gaming community.

Emotional gains derive from making gaming more enjoyable through ease of use and content customers enjoy. It also enables gamers to play and have fun together as well as giving them the sensation of success. The latter can be achieved by allowing them to advance to higher levels by letting them play as often as they want and with sufficient quality from different devices and locations. In addition, offering a high variety of different games as well as lowering entry barriers for non-gamers to explore video gaming can be an emotional gain in terms of letting the customer try out something new and take a break from reality.

Regarding functional **customer pains**, when using a cloud gaming platform/service to access games, a customer could suffer from bad quality, latency issues, high bandwidth requirements, or also the fact that he or she would need to pay for an already purchased game again to also play it via the cloud.

Continuing with social customer pains, latency issues could hinder the customer from properly playing a game and hence hamper a gamer from interacting with others. Especially multi-player games require good Internet quality and speed to compete as well as to reach higher levels. Thus, a gamer who falls behind because of latency issues can possibly not reach a higher status within the gaming community and would probably not even be seen as a proper part of it. Besides, related to gaming in general, a customer could be perceived as socially awkward by others (especially by non-gamers) for the mere fact that he or she is playing video games (Kowert and Oldmeadow 2012). This is due to the stereotype of online video gamers which centers mainly around social incompetence and is hence perceived negatively (Kowert and Oldmeadow 2012). As a consequence, the social status and/or perception of a customer within the non-gaming community could be damaged or reduced due to his or her gaming activities (at least if other people know or find out about it) (Kowert and Oldmeadow 2012).

Moving on with emotional customer pains, latency issues could likely annoy a customer while playing a game and make him or her unhappy. Additionally, if latency holds a customer back from reaching higher levels, especially regarding fast-played ego shooter or car races

games, he or she could feel the sensation of failure and inferiority. As well as feeling excluded from the gaming community if latency hinders a gamer from properly interacting in multiplayer games. Regarding the gaming library, a limited gaming library could bore the customer and impede him or her from feeling the sensation of experiencing something new and taking a break from reality.

For describing the gain creators and pain relievers, real-life examples from existing cloud gaming platforms will be used in the following.

Starting with **gain creators**, it must be mentioned, that all selected cloud gaming services, namely Xbox Cloud, Amazon Luna, PlayStation+ Premium, and GeForce Now, allow streaming video games from many different devices (PC, Laptop, mobile devices, Xbox*, PlayStation*) and hence allow the customer to play from everywhere (Grunin 2022). In addition, cross-device playing is possible, meaning that a game can be started on one device and be continued on another one like in the example of Xbox Cloud (Xbox 2022).

Further, Xbox Cloud as well as PlayStation's cloud services offer a broad range of games that are either Xbox/PlayStation-native games or non-native games to enlarge their gaming library for customers (Xbox 2022; PlayStation 2022). For that matter, Xbox also entered a close partnership with the video gaming publisher Epic which also grants its users cloud access to the very popular game Fortnite (Xbox 2022). The CEO of Microsoft, Satya Nadella, explained in a LinkedIn post the reason for the partnership with Epic games as follows: "We're partnering with Epic Games to make Fortnite available with Xbox Cloud Gaming, as we build on our commitment to using the power of the cloud to bring great games to more people across more devices" (2022). Moreover, PlayStation+ Premium gives cloud users the possibility to buy games for streaming on top which may not be included in the subscription to offer an even larger range of games for cloud gaming (PlayStation 2022). Following up on this, GeForce Now is the cloud streaming service that is most open in terms of what games can be played via their cloud service as their business model relies primarily on Bring Your Own

Game (BYOG) (GeForce Now 2022). Previously purchased games can hence also be used for cloud gaming through GeForce Now's cloud gaming platform (GeForce Now 2022).

To give customers even more options, Amazon integrates their cloud gaming service into their existing offer meaning that Amazon Luna games can be launched with the voice of Alexa on Fire TV and Fire tablets (Amazon Luna 2022).

Finally, **pain relievers** are outlined. Starting with Amazon Luna, it can be noted that the entry barriers for new customers and especially non-gamers are significantly lowered as it is included in the common and very popular Amazon Prime subscription. The subscription tier prime gaming is free of additional charge which invites prime members to try out cloud gaming at no additional cost (Amazon Luna 2022). Moreover, Amazon Luna reduces complexity and gives customers easier orientation with their five simple subscription tiers (more general library (Luna+), family games (family channel), retro games and classics (retro channel), Ubisoft games (UBISOFT+) as well as party games (jack box games)) (Amazon Luna 2022). Amazon Luna, therefore, supports parents in deciding and reducing time in searching for family/kids-suited games (Amazon Luna 2022). Another pain reliever that applies to all cloud gaming services is the fact that parents do not need to be home with their children to access games. Also, during holidays or while waiting in line for a doctor's appointment parents can easily entertain their children as also easily portable devices can be used for game streaming.

Further, Amazon Luna created the Luna Controller to reduce latency by 17 to 30 milliseconds vs. local Bluetooth connection among Windows PC, Mac, Fire TV, and Samsung Smart (Amazon Luna 2022). The controller directly connects to the cloud without the need for any additional setup (Amazon Luna 2022). Likewise, Xbox also designed a controller for similar purposes (Xbox 2022).

For very price-sensitive customers, Amazon Luna's and GeForce Now's subscription tiers are relatively low in cost, reducing pains deriving from financial burdens. GeForce Now offers 100 free-to-play games, so no single purchase is necessary for customers to start with or

try out cloud gaming (GeForce Now 2022). For Amazon Luna, most subscription tiers cost below \$10 per month and prime gaming is free of charge (Amazon Luna 2022). But a prime membership is a precondition to using Amazon Luna in the first place (Amazon 2021). For GeForce Now, three different subscription tiers exist, including one free tier with lower quality and session length, one \$9.99 per month tier with medium quality and session length, and one \$19.99 tier with high quality and session length (GeForce Now 2022). In contrast, PlayStation+ Premium costs 17.99\$ per month and Xbox Cloud 14.99\$ (Xbox 2022; PlayStation 2022). However, both Xbox Cloud as well as PlayStation's cloud service, create easier access to their existing customers by directly integrating their cloud service into their already existing online subscription tiers (Xbox Ultimate Game Pass subscription and PlayStation+ Premium), hence resulting in no extra costs for users who already subscribed to these tiers.

Additionally, both Xbox and PlayStation, offer traditional gaming via downloading games first as well as cloud gaming, so users get more options to play games (Xbox 2022; PlayStation 2022). Therefore, customer transition is facilitated, and users perceive the service as just another way to play their games, instead of a new, closed-off world that requires a complete reset. Xbox Cloud as well as PlayStation's cloud service also tries to tackle the problem of redundancy by allowing the streaming of Xbox/PlayStation games that have already been purchased for downloading, hence no additional purchase to stream these games is necessary (Xbox 2022; PlayStation 2022). Consequently, also entry barriers are lowered. If players can take their already acquired games with them, they are less hesitant to try out the technology and accessibility behind cloud gaming.

Regarding the topic of "taking a break from reality", it must be mentioned that especially during the pandemic, online video gaming and cloud gaming have reached more importance than ever (Cohen 2020). According to a survey conducted by Piplsay of 24.000 gaming interested US-Americans, 52% stated that they became more interested in cloud gaming due to the pandemic and resulting lockdowns (Piplsay 2020).

To provide more insights into the CGPPs own thoughts on how or in what sense they are adding value, four quotes were collected:

(1) Marc Whitten, the Vice President of Amazon Entertainment Devices and Services: “We created Luna to make it easy to play great games on the devices customers already own and love” (Amazon 2020).

(2) Catherine Gluckstein, Vice President of Xbox Cloud Gaming, Microsoft: “At Xbox, we’re always looking to make gaming available to more people in more ways. Since launching Xbox Cloud Gaming (Beta) two years ago, we’ve continued to expand device support: bringing Halo Infinite to entry-level PCs, Forza Horizon 5 to iOS phones and tablets, Microsoft Flight Simulator to Xbox One, and hundreds of games to even more devices like 2022 Samsung Smart TVs. As we look ahead, we will continue to meet people on the devices they already own, breaking down barriers of entry to play” (2022).

(3) NVIDIA founder and CEO Jensen Huang: “Gaming is enjoying a multi-decade expansion as technology continues to make new game experiences possible. (...) While we continue to drive the most advanced gaming technology with GeForce RTX, we have dedicated the past decade to refining and expanding GeForce NOW cloud gaming to bring the best gaming platform to anyone with a computer” (NVIDIA 2021)

(4) Jim Ryan, president and CEO of Sony Interactive Entertainment: “We have accumulated a wealth of knowledge in cloud gaming since PlayStation Now’s launch in 2014. That, coupled with our 25-year legacy in the games business and strong partnerships we’ve forged with publishers, positions us to continue leading and innovating in this field as the gaming industry evolves” (Sony 2019).

To shortly summarize the entire *What* chapter, it can be stated that the main value proposition of cloud gaming consists of simplicity, accessibility as well as affordability. Compared to traditional platform providers like Console Gaming, Digital Distribution Only, and D2C Publisher, cloud gaming eliminates pains like time-consuming downloads and high upfront

costs for gaming hardware as well as being limited to playing with a WIFI connection and adds gains like the ease of use and high flexibility for customers.

The cloud gaming value proposition can be considered as strong as it offers an unprecedented way of gaming designed to tackle specific customer jobs, pains, and gains. By disrupting the way games are computed, this business model's value proposition significantly differs from traditional video gaming platform providers and hence can add value in ways in which others cannot.

4.2 Advantages & Vulnerabilities

To examine if the cloud gaming business model can create a competitive advantage, the in-depth sections are reviewed holistically. The section is structured in three parts. First, internal consistency and drivers of competitive advantage are derived. This section is followed by strategic vulnerabilities. Lastly, external consistency and drivers of change affecting the competitiveness of the business model in its environment are dissected.

4.2.1 Competitive Advantage

According to Porter (1985), sustainable competitive advantage can be achieved either in cost leadership or differentiation. CGPPs, integrating computing technology firm-side, focus on differentiation to provide superior service, hoping to gain more revenues than the added costs. The main differentiators are accessibility across devices and low barriers to entry for customers.

Low barriers to entry stem from the removal of hardware on the consumer side, allowing more customers to try out gaming without high one-time investments to enter the console or PC ecosystems. CGPPs thus potentially reach more customers and democratize gaming (Wierzbitzki, Tybus, and Firth 2021). With fewer devices, the same market can be served as users can play on devices they already own and which they also use for non-gaming purposes, like mobile devices and lower-powered laptops (Newzoo 2018).

Accessibility, on the other hand, is increased as customers can use cloud gaming across multiple devices, including mobile, instantly without the need to download. Previously, the architecture of mobile games differed from more complex PC and console games to accommodate less powerful hardware. CGPPs enable cross-device playing, meaning that a game can be started on one device and continued on another one (Wierzbitzki, Tybus, and Firth 2021). Due to the centralized architecture, single-player games can even be turned into multi-

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player games by running one game on multiple devices (Newzoo 2018). Further, games are accessible through more access points, such as Smart TVs and app stores, opening the option to capture casual and non-gamers with low entry fees and lucrative add-ons like microtransactions.

As cloud gaming is the first business model which can fully integrate every step in the value chain, a competitive advantage also derives from the ability to collect and use customer data. Platform providers can use predictive analytics to tailor recommendations more effectively than their competitors from other business models, and utilize data in other ways like monetization, fraud detection, or game design to keep players engaged (Indicative n.d.). This results in increased time spent on the platform and higher customer satisfaction. Personalized content recommendations are used by major social media firms that aim to increase usage times, as well as video streaming platforms like Netflix and Disney+, which operate similarly to gaming platforms, charging monthly and trying to bind customers.

On a further note, platform providers gain market power from customers, as customers lose ownership of products, and instead rely on firms to provide a constant service. Cloud gaming moves gaming from a product-centered business model to a fully service-centered business model. Consequently, players also lose the ability to resell or pirate games. These aspects combined add price power, as customers do not own anything anymore, they just rent the service which could be shut down at any point. The subscription nature also adds regular financial income streams in the long term, compared to an income structure that is reliant on individual purchases based on content cycles like holiday seasons.

4.2.2 Strategic Vulnerabilities

After highlighting the competitive advantages, the strategic vulnerabilities are presented, structured according to (1) market and innovation, (2) platform providers, and (3) end users.

Regarding **market and innovation**, the entry barrier for new competitors is high, as heavy upfront investments in cloud infrastructure and content acquisition are necessary to attract players (Interview 2 with Senior Business Development Manager at Tencent Cloud, 2022). However, the content acquisition is restricted because alliances with and acquisitions of game publishers lead to exclusive content on the respective platforms. An example of this is Epic Games, which enters new partnerships with game developers (Epic Games Inc. 2020). The offering of AAA franchises is a decisive factor for consumers (Interview 1 with Market Consultant at Newzoo, 2022). If all these games are exclusive to incumbents, new entries are not competitive, rendering market entry inept. Consequently, innovation may suffer, and games are not multi-homed anymore. This yields intense competition for customers, which constitutes a fundamental component in the profitability of this business model. Accordingly, an oligopoly, or even a duopoly, might emerge. Incumbents like Microsoft and Sony established and locked in their customer bases over the years, dominating the market due to high switching costs. Further, there are already cartel investigations in session because of the pending acquisition of major publisher Activision Blizzard by Microsoft (Warren 2022).

For the **platform providers**, the main weakness pertains to the need for high upfront investments for content and infrastructure upon market entry. No new venture can be certain of success, but this constitutes an elevated risk for emerging companies. The diminishing returns of game sales, as cloud gaming content is often available within a subscription service, pose a risk of costs exceeding returns. Competing business models generate the biggest part of revenues from individual game selling, realizing more income per game sold than the CGPPs

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through the overlying subscription fees, especially with an adaptation from gamers with excessive playtime.

Another concern pertains to the susceptibility of the cloud to system breakdowns, which would result in a so-called cloud outage (Patel, Mehrotra, and Soner 2015). The components of the cloud need to be updated regularly, and the operating environment must be constantly revised and adapted. Further, the damage is greater if a cloud service malfunctions, than if only one piece of hardware, like a console at home, crashes, as it leaves all users stranded. Unsurprisingly, resolving cloud issues also takes much longer than troubleshooting the individual hardware at home (Newzoo 2018), corresponding to a negative influence on customer satisfaction (Patel, Mehrotra, and Soner 2015). Additionally, the barrier to gamers switching from traditional gaming might increase.

Other vulnerabilities concern the end user and expose reasons why the business model could fail due to a lack of adaptation. Closely connected to physical ownership, some players might want to continue to own the games they are playing (Interview 3 with Gaming industry manager at Google, 2022). While the loss of ownership can be beneficial for CGPPs if the business model is adopted, it could cause consumers of traditional gaming platforms to be resistant to switching.

As this business model relies on external, uncontrollable factors, like stable and fast internet with a high bandwidth which is still lacking in many areas, weaknesses derive from it. For many core gamers, connection issues impose high switching costs (Snapt Inc 2021), as this issue does not occur on traditional platforms to this extent, therefore lowering adoption from core gamers (Snapt Inc 2021). These gamers often own expensive hardware. Hence, they are invested financially and emotionally, resulting in further switching costs for them (Interview 9 with core gamer, 2022; Interview 4 with frequent gamer and IT student, 2022). The slow adoption of cloud gaming results in unprofitability as high customer numbers are needed to

offset costs and the subscription-based revenue model (Interview 6 with Senior Software Engineer Xbox Cloud Gaming, 2022).

4.2.3 Drivers of Change

External consistency ensures that the business model fits into its macro-environment. Drivers of change are technologies and mega trends which influence multiple industries and cannot be controlled by single companies (Gassmann, Frankenberger and Csik 2013). Instead, firms must adjust their business model to maximize the benefits or minimize risks stemming from each driver.

The most prevalent driver of change for CGPPs is increased connectedness through networks. 5G networks do not only allow for faster internet speeds for the individual, but they also facilitate more bandwidth, meaning more users can share the same network, and drastically reduce latency (Duffy 2020). Thus, 5G network development is fundamental to the success of cloud gaming platforms. Gassmann, Frankenberger and Csik (2013) further note that technology develops exponentially instead of linear, meaning cloud gaming services are set to increase in customer appeal and server efficiency as networks get more developed. Further technological trends include Virtual Reality (VR) and Augmented Reality (AR) which come with increased processing needs. End-user hardware is not built for processing complex VR/AR games and is costly for individuals as requirements rise. Cloud gaming benefits as external data centers running multiple GPUs which are using fractional ownership across customers based on demand can more easily compute such games (Newzoo 2018; Rao 2021; Wierzbitzki, Tybus, and Firth 2021).

Secondly, the megatrend of resource shortages is shaping the success of the business model. For one, the number of cloud gaming users could exceed the availability of resources at some point. The cloud technology and the data centers to accommodate it, require, inter alia,

high energy usage. Also, the servers must be broadened with each customer, and thus, the associated costs of upkeep rise with the growing customer base. Subsequently, the data centers necessary to accommodate the cloud technologies, are rather energy inefficient and in turn, harmful to the environment. CO₂ emissions are high as the servers of the data centers must be cooled to operate (Patel, Mehrotra, and Soner 2015). Additionally, environmental regulations might apply due to resource restrictions of energy, or security-based regulations because of data privacy or their impact on the internet infrastructure itself (Mariano and Koo 2015). The environmental aspect grows in significance due to geopolitical conflicts and energy shortages, which encouraged recent political discussions (Interview 2 with Senior Business Development Manager at Tencent Cloud, 2022). Contrarily, limited resources also affect competing business models which require hardware powered by processing chips. The semiconductor segment is prone to shortages as seen in recent years (Rao 2021, Newzoo 2022). Cloud gaming providers can share the processing chips between multiple users and consequently reduce the dependency on semiconductor chips.

To summarize advantages and vulnerabilities, CGPPs face increased costs compared to competing business models, including constant variable costs to maintain the cloud services. The business model can only create a competitive advantage from differentiation if the number of new customers can offset the added costs. Adoption by customers, however, is relying not only on internal factors but also based on the development of megatrends such as 5G network extensions. Innovation might also suffer if incumbents are too dominant. Based on the analysis, the cloud gaming business model is financially risky but offers major upside potential for firms who excel against direct competitors to prepare a high-quality platform ready to capture the mainstream market when adoption comes closer.

5 Recommendations

Based on the analysis above, the authors developed a set of recommendations with a twofold purpose: for one, to minimize the impact of the observed weaknesses, and secondly, tools to expand on the present strengths of the business model. Said recommendations serve as managerial implications for the CGPPs.

A list of ideas was generated and evaluated according to the criteria of the Design Thinking method (Chasanidou, Gasparini, and Lee 2015). Subsequently, the suggestions were rated out of five (1 weakest to 5 strongest) in terms of viability (V), feasibility (F), and desirability (D). The scoring reads as follows: (x/5 D), meaning that a recommendation was rated x out of five in terms of desirability. Desirability reflects the consumer perspective, and respectively, whether an idea or change is wanted. Feasibility deals with the chances of implementation, more specifically, whether it is even possible based on technology and/or know-how and resources. Viability concerns the profitability of the idea (Chasanidou, Gasparini, and Lee 2015). In theory, by considering all three criteria, the recommendation is assumed to be more innovative. This evaluation method was chosen to ensure that the recommendations were innovative and realistic.

The suggestions were then grouped together content-wise, yielding three overriding strategic recommendations. The first pertains to the attractiveness and longevity of content, the second maximizes the benefits that originate from strong accessibility, and the third aims to tackle the threat of slow internet speed and latency concerns. Each of these main recommendations subsumes a variety of sub-recommendations, called tools, that contribute to their success. Said tools are further illuminated by the inclusion of examples to increase comprehension of execution.

5.1 Recommendation 1: Invest in the attractiveness and longevity of the content offer

The **first managerial recommendation** concerns the **attractiveness** and the **longevity** of the platform and its **content offering**. As content was identified as one of the key success drivers for CGPPs, several measures should be taken to exploit these benefits. The toolbox includes four measures in total:

- (a) Collaborate with publishers to secure (exclusive) blockbuster AAA games
- (b) Allow publishers to use in-game advertisements and microtransactions
- (c) Launch customer loyalty programs to reduce customer churn
- (d) Leverage advanced cloud technology to foster innovation

5.1.1 Tool 1A: “Collaborate with publishers to secure (exclusive) blockbuster AAA games”

(3/5 V; 5/5 D; 4/5 F)

Partnering with publishers is essential to populate a platform with content, as gamers are used to playing their favorite games on the platform of their choosing. However, many cloud gaming platforms have limited content, as the market is currently fragmented (Newzoo 2022), and platforms seek to boost their uniqueness compared to competitors by advertising exclusive content. To combat the customer perception of having an incomplete set of content on the platform, which is inferior to open traditional platforms, CGPPs must invest heavily into acquiring the most sought-after content. By bringing all major franchises onto a platform, CGPPs make sure to not miss out on customers that cannot find their favorite franchise on said platform.

In detail, CGPPs must form partnerships with all major publishers to cover against missing out on large parts of customers. Because of their mainstream appeal, CGPPs must focus on content needs of the majority of consumers, investing in popular franchises instead of niche titles. Thus, they are not inferior in third-party content compared to digital distributors

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like Steam or console platforms. By executing this recommendation, CGPPs manage to eliminate a weakness that is threatening to sabotage the long-term prospects of growth for the business model. CGPPs must aim to be on par with other business models in the content regard, as it is not core to the prevailing business models, and instead turn the focus to the core strengths which are accessibility and low barriers of entry.

The recommendation is easier to execute for industry players like Sony and Microsoft, who already possess long-term relationships with publishers because of their console business. For new players in the gaming platform industry, like Amazon or Nvidia, the partnerships could be costly and endanger profitability. They might need to find other, less expensive content niches (e.g., family, retro, indie) with leaner cost structures, acting as a complement rather than a substitute to console giants.

Regarding viability, the tool makes business sense, addressing a key vulnerability, and allowing for greater platform attractiveness and expected revenues. However, for smaller platforms, it is a major financial undertaking and might put the company at financial risk, as future new customer cash flows are not guaranteed. As described above, the long-tail model might need to be considered. The tool is of the utmost desirability for the customers, as fragmentation creates pain and lowers the attractiveness of the platforms. As for feasibility, financial constraints can be present for some companies, while time-to-market is expected to be quick. Most companies already have partnerships in place and can build on these capabilities.

5.1.2 Tool 1B: “Allow publishers to use in-game advertisements and microtransactions”

(4/5 V; 3/5 D; 4/5 F)

To profit from the low entry barriers on cloud gaming platforms, another tool connected to partnering with publishers can be useful. CGPPs should incentivize publishers to pay to put

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their games on the platform, as they can then create additional revenue through in-game advertisements and microtransactions (Interview 1 with Market Consultant at Newzoo, 2022). Overall, publishers would profit from CGPP's network effects and create additional revenues through ads, adding advertisers in a hidden revenue model which lowers the cost for consumers. The product placements create a two-sided market, with advertisers and game customers as actors and the game as mediator (Herrewijn and Poels 2013). Publishers would welcome to see the potentially large userbase of cloud gaming platforms getting access to their games, not only for product placements but also for digital add-ons in the form of microtransactions. The principle of microtransactions is to offer affordable in-game objects to a high number of players (Tomic 2017). The underlying business model pattern is to target the poor resulting in low average revenue per customer but high cumulative revenue if enough customers are buying in.

CGPPs must charge publishers for this value creation once a high enough customer base is established, like Apple and Google charge fees of up to 30% per app sale on their app stores (Gurman and Savov 2021). For CGPPs who create exclusive games for their platform, the tool can be used likewise for these games. Microtransactions and games as a service extend the longevity of games and extend the time consumers spend on the platform, resulting in additional revenue streams. It should be noted that platforms must have considerable bargaining power. Smaller platform providers cannot make these requirements, adding to the possibility of an oligopoly forming.

From a business perspective, the hidden revenue model decreases the monetization pressure on the customer. On a negative note, microtransactions' effects on society are polarizing and must be implemented carefully to not spark controversy (Raneri et al. 2022). Regarding desirability, it results in more games on the platform which is addressing an important customer need. On the other hand, an increased number of advertisements and extra

monetization inside of games are not among customers' priorities. The undertaking is feasible, as it builds on core capacities such as high accessibility and low barriers to entry. There might be a negative effect on the branding of the product, as for the before mentioned aspects of customer skepticism regarding microtransactions.

5.1.3 Tool 1C: "Launch customer loyalty programs to reduce customer churn"

(5/5 V; 4/5 D; 4/5 F)

One vulnerability of subscription services is customer churn, which describes losing customers over time. Keeping customer retention high is crucial, as acquiring a new customer is up to 20 times more expensive than retaining a customer (Vafeiadis et al. 2015). Customer loyalty programs can be used to reward customers for staying on the service for an increased time, offsetting churn. Loyalty rewards are small investments to keep the customer and build a relationship (Gassmann, Frankenberger and Csik 2014), rather than losing them and making large efforts to gain new ones.

Explicitly, platforms can collaborate with publishers to create rewards for popular games, like in-game items which would usually be acquired for money. This way publishers increase the attractiveness of their games as they get promoted on the platform with exclusive content, and users feel more drawn to the games through rewards and want to continue playing through the platform. Electronic Arts, using the D2C Publisher model, already rewards users with in-game items for staying subscribed to their EA Play Pro subscription service (Electronic Arts 2022).

Customer loyalty programs are very viable, as they are already proven instruments used in other industries and business models, especially gaming. They create win-win situations for all parties involved platforms, publishers, and customers. For customers, loyalty programs are very desirable, as they get rewarded for simple actions. They have added benefits that come at

little cost but increase switching costs. The recommendation is feasible because it uses existing capabilities and does not face any financial or operational constraints. Loyalty programs are quick to implement without much risk involved.

5.1.4 Tool 1D: “Leverage advanced cloud technology to foster innovation”

(3/5 V; 4/5 D; 3/5 F)

As games that are computed centrally at the cloud infrastructure provider entail new possibilities regarding computing power and complexity of games, platforms should leverage this strength and create cloud-exclusive games to create a blue ocean instead of just competing in the red ocean. Cloud-exclusive games can use more resources than locally computed games, enabling developers to create more advanced games than before. Customers thus attain a new value from subscribing to cloud services. Other than convenience and accessibility, the games could also become more advanced, forcing customers to switch to the platforms to play the newest blockbuster games.

In detail, CGPPs must cooperate with developers to expand on this new game architecture while existing blockbuster games finance the platform until cloud game innovation is advanced. Publishers might be contacted to partner with a huge franchise, resulting in higher awareness of the game. Games like Fortnite or Roblox might develop the integration of the metaverse into gaming. This tool is especially relevant for those companies that already own game studios and have experience in developing games. Companies like Meta might use their experience in Facebook gaming and the metaverse to create synergies.

Viability depends on the extent of experimentation and execution in this recommendation. In general, creating and marketing games for cloud-only is very viable, even though its reach is reduced to the exclusive subscriber of the cloud and still low user numbers. Further, innovation like integrating the metaverse is still in the experimentation phase, and we

can see lots of funds being sunk without proper ROI (Huddleston Jr. 2022). Exclusive games are both very desirable and somewhat undesirable for customers. On the one hand, innovation excites customers, and the games could be taken to a new level. On the other hand, gamers do not want exclusive games, as it increases their switching costs. Exploring innovative solutions around cloud-based games is not building on the core capabilities of most platform providers. Even though some have substantial developer teams, their core is around building platforms, not games. Additionally, this undertaking is not fast to implement, many projects are long-term experiments, without any short-term ROI plan.

5.2 Recommendation 2: Maximize benefits originating from strong accessibility

The **second set** of the author's managerial recommendations centers around potential ways to **maximize the benefits** of cloud gaming, that stem from its present **accessibility**. To implement this main recommendation, four tools are proposed.

- (a) Implement price scaling and dynamic pricing
- (b) Provide easy access to the cloud by means of a physical box
- (c) Focus on mobile
- (d) Collaborate with internet providers

5.2.1 Tool 2A: "Implement price scaling and dynamic pricing"

(4/5 V; 4/5 D; 4/5 F)

The first suggestion is that platform providers should utilize different tiers through which users can subscribe. Tiered pricing allows companies to cater to a wide variety of customers, that differ in terms of product needs as well as the willingness to pay (Paddle 2022). Accordingly, customers are presented with the option to choose from different plans and can thereby decide to pay for additional value, whether that manifests in more features or higher

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service usage. By doing so, core gamers are better monetized. With a subscription model, essentially, the more you play, the less you pay for an hour of use. Since the maintenance costs to keep the cloud infrastructure running are already relatively high, it seems logical for companies to optimize their pricing offer to counteract this and ensure that every player pays “enough” per hour to cover the costs for the platform providers. Moreover, different tiers would ensure that no user must “overpay” to compensate for an “underpaying” user.

Hereby a weakness of this business model (i.e., rising costs with each user and hour played) as well as the absence of adequate pricing plans that satisfy all players would be mitigated, whilst the main strength, namely an easy entry barrier for non or casual gamers will be preserved.

In terms of viability, CGPPs, whether large or small, should include this practice in their pricing portfolio because through this individualized approach, they are able to optimize their revenues (Paddle 2020) and take an important step towards adequate pricing plans that satisfy all stakeholders. Additionally, this solution is assumed to be perceived desirable by the customers as individualization, and closely connected to that, perceptions of fair pricing, are highly valued, especially when it comes to customer retention in the long run. It should be fairly easy to implement the different pricing tiers, however, attention must be paid to transparency and reason underlying the tiers.

Dynamic pricing also offers a more individualized approach. As some customers might only be interested in one game instead of a huge library, these customers could be at risk to disregard the platform because of high subscription fees. A dynamic pricing model could suggest to this player an exclusive price acquire the rights to play this one title alone (Interview 1 with Market Consultant at Newzoo, 2022) or pay less to play a maximum number of games per month. In summary, even though most CGPPs operate on a one-size-fits-all subscription model as of now, that must not be the only way to monetize the platform.

Besides this, there is also the option to monetize the data to third parties. Using data to individualize the offering and price is very desirable to the customer, as the same content becomes more tailored around their needs. Customers also prefer to see tailored prices if they do not fall into the common usage pattern. Data collection is already a huge part of all platform providers, so the tool should be easy to implement. Dynamic pricing models might require advanced algorithms and managerial caution to not dilute pricing structures.

5.2.2 Tool 2B: “Provide easy access to the cloud by means of a physical box”

(3/5 V; 3/5 D; 4/5 F)

By having a physical access point in front of them, it might be easier for people to grasp the advantages of cloud gaming because they can connect them to something tangible. With this tool, one of the strengths of cloud gaming is highlighted, because it would still be a cheaper option than the acquisition of new hardware and it minimizes the weakness of initial skepticism and thereby facilitates early and easy adaptation.

All CGPPs could develop such a tool, it would however be easier for those with console expertise, such as Microsoft, Sony, or Nintendo. With this cloud gaming box, CGPPs would complement peoples’ habit of having a streaming box next to their TV (Interview 1 with Market Consultant at Newzoo, 2022). It was mentioned that there is still some value in the ability to run something locally or possess supporting hardware, but companies could offer a cheaper, less complex version. This could for instance be a small, cheap device that you will be able to plug into your TV and like that, you will have the opportunity of instant access to hundreds of cloud-based games (Interview 6 with Senior Software Engineer Xbox Cloud Gaming, 2022). In doing so, companies could set up an additional income stream.

A potential downside of this tool is that profitability might remain questionable. Concerning the customer side, it is a very subjective decision, as some will probably very much

like the idea whilst others do not wish for some sort of physical component. Nonetheless, the development of such a device would especially be easy for current console manufacturers, as they already possess the in-house knowledge to successfully implement it.

5.2.3 Tool 2C: “Focus on mobile”

(4/5 V; 5/5 D; 4/5 F)

CGPPs should further focus on the mobile market, as this segment grew rapidly and accounts for over half of the industry at present (Interview 3 with Gaming industry manager at Google, 2022). The mobile market consists of different customer segments, making it possible to capture a huge number of customers. Also, it facilitates inserting in-game advertisements as an additional revenue stream as these are easier to implement and analyze on smartphones (Interview 3 with Gaming industry manager at Google, 2022). This tactical emphasis would lead to even better accessibility of the cloud gaming experience, would make it highly convenient, and might even mitigate latency issues.

Explicitly, the CGPP should concentrate on making many games available on the mobile market, maybe even exclusively with an array of mobile games capturing the different sectors of users. Additionally, the user experience should be improved, and in consequence, the convenience and ease of use increased. For instance, multiplayer games could get started by sharing a link through social media, which the users have solely to click on, and the game would start on their smartphone straightaway (Interview 1 with Market Consultant at Newzoo, 2022).

All CGPPs can utilize this tool as there are no explicit barriers to conquer, thus, it might be a chance for smaller independent CGPPs to exploit a niche.

The Viability is high, as the mobile market is such a huge market, and the requirements to shift to this device segment are not very cost intense and focusing on one device might likely

result in even more profit due to cost savings anyhow. The customers would also desire this shift greatly as the market growth of the last years let suspect, especially in a “back to work” environment, where commuting and therefore gaming time increases again. Feasibility is out of question as well as the games must be adjusted to the different devices anyhow, thus not yielding much further effort.

In conclusion, this tool is easy to realize but it intervenes highly with the overall strategy and positioning of the firm. Consequently, this step should be well thought out and, if chosen, committed to.

5.2.4 Tool 2D: “Collaborate with internet providers”

(4/5 V; 4/5 D; 4/5 F)

This tool recommends forming collaborations with telecommunication providers. The goal is to include the cloud gaming offer of the CGPP in the 5G offer of the telecommunication provider. The collaboration should include that every customer, who gets the 5G access, gets a subscription to the company’s cloud gaming offer, for example for one year, for free as an extra. CGPPs would reach audiences with the required internet connection and, as it is gratis, especially current non-gamers will be inclined to try cloud gaming, mitigate the skepticism, and increase customer acceptance. The consumer will also be locked in with a higher probability as switching costs after playing on one platform for a long time are higher due to loss of game scores or selection. This would lead to a wider adaptation of their cloud gaming offer, increasing market share.

A good example of a successful implementation of this tool is the TV streaming service Disney+, which included their subscription upon their release in the mobile contracts of telecommunication providers (Telekom n.d.), securing their position after entering a highly competitive market.

Due to the to-be-expected customer gain and awareness creation, which will result in monetary benefits, this tool seems to be viable. Desirability is assumed to be average as it is uncertain if people want to try it out or are interested in it at all. However, a negative reaction should not be expected as the successful example of Disney+'s partnership lets suspect. The feasibility is dependent on the status of the cloud gaming company as the telecommunication provider must want the partnership, which often correlates to an image improvement through such alliances. Therefore, the bigger cloud gaming corporations do have an advantage here. But overall, it is seen as feasible as it has been already done with other streaming services.

Concluding, it seems a good tool to improve awareness, strengthen the firm's position and reach, as well as lock in new customers.

5.3 Recommendation 3: Tackle the threat of slow internet speeds and latency concerns

The authors' **third** and last **set** of managerial recommendations aims at tackling the **threat of slow internet speed and latency issues** which are one of the core vulnerabilities of cloud gaming. For the implementation of this main recommendation, three different tools are suggested, which are outlined in the following.

- (a) Share resources between hardware and cloud
- (b) Reduce bandwidth requirements
- (c) Focus on single-player and 'slower' games

5.3.1 Tool 3A: "Share resources between hardware and cloud"

(4/5 V; 5/5 D; 3/5 F)

This tool directly tackles two weaknesses of the cloud gaming business model - latency and skepticism from core gamers. Core gamers currently do not trust cloud technology and

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prefer using their hardware (Interview 9 with core gamer, 2022). Hence, a hybrid solution could significantly reduce their skepticism.

Tool 3A focuses on shared resources between hardware and the cloud by computing some parts of a game via the cloud and other parts via the customer's hardware (Eastman 2022). Cutscenes that are heavy in terms of workload for graphics processing, but do not rely on quick reactions, could be computed by the external servers of the cloud whereas other parts of the game are still being computed locally (Eastman 2022).

In concrete terms, this means that separate services render parts of the game (Eastman 2022). The core game would still be designed traditionally and downloaded to a customer's hardware meanwhile dynamic effects would be designed for the cloud specifically and not be downloaded (Eastman 2022). This recommendation is most suitable for cloud gaming platforms that have their own publishing studios and can hence directly create these types of "hybrid" games themselves.

Concerning viability, the tool allows profiting from synergies by combining already existing technologies. Thus, cloud gaming would enlarge its value proposition and become more interesting for core gamers. Customer desirability is very high as the main issue of latency is directly tackled and core gamers could still use their hardware while playing which is very important to them (Interview 4 with frequent gamer and IT student, 2022; Interview 9 with core gamer, 2022). In addition, hybrid games serve the purpose of increasing options for how to play which is perceived as a core strength of the business model. As for feasibility, technical implementation will face upfront investment as well as early-stage challenges by connecting and harmonizing the cloud with traditional technology.

Overall, sharing resources between cloud and hardware will generate synergies and enable CGPPs to offer their customers an additional option to play.

5.3.2 Tool 3B: “Reduce bandwidth requirements”

(3/5 V; 4/5 D; 3/5 F)

Reducing the bandwidth requirements of games is another measure to mitigate the technological weakness of latency (Interview 1 with Market Consultant at Newzoo, 2022). Instead of creating solutions to cope with the high complexity leading to high bandwidth requirements, another approach is to intentionally reduce complexity. This might not be equally successful for all types of games but has already proven successful in the case of the game Fortnite (Nelson 2018). Originally a high-quality game for adequate gaming hardware only, a simplified and less complex version has been released as a mobile version and successfully adopted by the gaming community (Nelson 2018). A similar approach could therefore be chosen for cloud gaming by reducing game design complexity through components such as game structure, game feedback, and game representation (Westera et al. 2008). Like the aforementioned tool, mainly CGPPs with their own publishing studios are capable of and suitable for its implementation.

Touching on viability, from the business side this tool is worth implementing as it efficiently circumvents latency by making external factors like bandwidth requirements less important. Most cloud gaming users do not have the hardware to play traditional high-quality games in the first place which is why it is unlikely that they complain about complexity-reduced versions of games. On the other hand, less latency implies a better overall gaming experience which is beneficial to all customer segments (desirability). Whereas feasibility on the other hand could be perceived as less powerful because significant complexity reductions will require major changes and required effort on the game coding side (Westera et al. 2008).

Conclusively, reducing bandwidth requirements is a promising option to tackle latency issues meanwhile the required effort and cost for modifications must be balanced.

5.3.3 Tool 3C: “Focus on single-player and ‘slower’ games”

(3/5 V; 3/5 D; 5/5 F)

The last tool to lessen latency and high bandwidth requirements is a mere content choice as well as categorization. As outlined before, not all types of games are equally affected. Circumventing latency by offering and/or signaling customers more suitable content is one way to mitigate this weakness.

CGPPs should either establish an additional category for games by bundling low-bandwidth games of all types or provide an additional tag for all games to inform about their level of latency exposition. In addition, CGPPs should design their content libraries by considering three factors: the popularity of the game, content variety, and cloud gaming suitability. The latter has not always been considered resulting in customer dissatisfaction while playing some games. If a game is not or less suitable in its original version, tool 3A or 3B can be suitable. Tool 3C is suitable for all CGPPs as it comes with neither technological nor financial distress.

Regarding the implementation possibility and meaningfulness, from a business perspective (viability) content choice is a very crucial pull factor. Focusing on less complex games could weaken this pull factor but on the other hand, improve the gaming experience by mitigating latency. Categorizing games serves mainly as orientation and information enhancement. However, it is still worth implementing as no additional costs result, the effort is low, and users’ expectations and awareness can be improved. Customer desirability is rather modest as customers generally prefer a very wide range of content. Nevertheless, by pre-selecting and categorizing games according to cloud gaming suitability customer disappointment can be circumvented while playing a game. Feasibility is extremely high as this tool implies no direct costs and very low effort.

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All in all, this third and last tool of recommendation 3 provides an additional low-effort measure to mitigate bandwidth issues which in combination with tools 3A and 3B does not limit nor constrain the offered content too much.

6 Conclusion

By contextualizing all parts, key insights can be derived from the analysis. Overall, cloud gaming has the potential to disrupt the online video gaming platform industry but requires adaptation to major external hurdles as well as a strong customer focus to convince enough gamers to switch over to the new distribution model of gaming. Consequently, the adoption hurdle is huge, and the following key insights must be taken into consideration to allow for the success of the business model.

First, as for the large and casual audience, CGPPs must use behavioral segmentation to properly address customers. Segmentation should not be demographic but according to gamer type, as core gamers have different needs than casual gamers. Casual as well as new gamers are captured through mainstream sources like common access points including Smart TVs or app stores.

Additionally, CGPPs benefit from lower entry barriers than competing business models. This stems from the flexibility in the revenue model for the customer and the high number of devices that are supported for seamless gaming. This Ease-of-Use, however, is expected by casual gamers who are used to frictionless gaming through their phones, at a low cost.

Third, content is key to success in the platform industry. No matter how advanced a platform is regarding user interface, quality of streaming, and revenue model, or else, it will not succeed if the content side is lacking. This puts pressure on platforms that are relying on publishers to populate platforms with large franchise titles. This results in considerable investments in partnerships, meaning that competitors with smaller cash reserves could potentially be priced out of the market, as they are not able to provide enough high-quality content.

Fourth, there is a major shift in revenue streams. While one-time purchases of both hardware and games were prevalent until the recent past, CGPPs not only rely on subscription

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fees for content but also the computing part. This results in a more spread-out revenue stream timewise, and a switch from a product-based focus to a service-based one.

Throughout the research process, we were able to gain further insights about the industry, with some recurring patterns, mainly: (1) There is a strong consensus that CGPPs will not replace existing business models soon. Instead, it is assumed that cloud gaming has a place as a complement to these business models, fulfilling the needs of a different target group. (2) Cloud gaming may resemble TV streaming platforms at first glance, but cannot copy the success of those, as it demands higher frequented and active inputs. Latency, illustratively, is not a factor for TV streaming, while it is a major issue for game streaming. (3) Further, cloud gaming has resource limitations, drawing back to energy consumption and resource intensiveness. Depending on the growth of the sector, limits might come into place, both financially and technologically.

Conclusively, cloud gaming offers a high potential upside by capturing the casual and mainstream market through low barriers of entry, but expensive content acquisition and latency issues could hinder the adaptation by players. The option to fully control the value chain reduces dependencies, but high upfront costs require a long-term view and commitment to an industry that is highly dependent on the external factor of internet speed. Due to increasing costs in the future, it is doubtful if the current pricing strategy with low subscription fees can be continued once platforms are populated with more players in the future and users split off in a fragmented market.

6.1 Limitations and further extensions

This paper was bound to certain limitations while analyzing different business models within the video gaming industry. First, the timeframe, as well as resources, were limited. Further, to focus on specific key players within the industry, a geographical focus was set on Northern America and its main players. This choice was influenced by the fact that most cloud gaming platforms are American and first launched their gaming platforms in the US. Third, as the video gaming industry is by nature very broad and complex, and has many different actors within the value chain, a content scope was required as well to compare business models situated on the same level of the value chain. Thus, online video platform providers were chosen for the variation of business models within the industry, and for the in-depth part, CGPPs were analyzed more closely. Fourth, for research purposes, nine interviews with industry experts as well as gamers were conducted. Open and semi-structured questions were asked, giving the interview partners space to respond freely and from a subjective point of view. All interview partners answered as individuals and not as official representatives of their companies or the gaming community. Hence, interviews were very subjective, and the total amount was limited due to the timely scope of the research project. Fifth, ongoing changes concerning the chosen industry as well as external factors cannot entirely be considered as this paper is based on a status quo that lies in the past when the research was conducted. Lastly, regarding the business model analysis, it must be noted that there is no single definition of the term business model that so far has been agreed on. This is, at least partly, due to its multidimensionality regarding its components, and hence which parts are taken together to define one business model is a question scientists could not agree on yet. Due to time as well as page limit constraints the authors could not consider all existing business model frameworks and needed to choose among them which also set limitations to the scope and angle of the conducted analysis.

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However, part of these limitations could be lifted by broadening the geographical scope and conducting a cross-border analysis considering fast-growing high-potential markets like Latin America or Asia and its respective key players, such as Tencent and YuanJing. In addition, the content scope could be extended by focusing on several actors along the value chain such as cloud service providers as they enjoy great bargaining power owning the core competency in the value chain. Lastly, by conducting more interviews as well as gathering official company statements through PR representatives, less subjective insights could be accumulated and longitudinal studies observing movements from industry players and changing consumer perceptions should be undertaken.

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Appendix 1

Interview 1

Interview partner: Market Consultant at Newzoo with overall lead of the cloud gaming section, male

Company Description: Newzoo offers games data products and services reaching from in-depth games tracking to gamer research as well as consulting.

Tobias Heckmann:

Exactly.

No.

Market Consultant:

Yep, go ahead.

Natalie Reyher:

OK, Tobi, do you want to start?

Tobias Heckmann:

OK.

Yeah. So, first, how do you think the future of cloud gaming is to be expected?

Market Consultant:

(...) Overall, I think the future is very positive. Our outlook for cloud gaming is quite bullish outside, but even among the industry we are not the most optimistic ones out there.

I think that cloud gaming has a lot in its favor. It's an excellent way to democratize access to gaming for a lot of people, who might not have the disposable income to buy very expensive gaming hardware. Or in other forms that maybe they have a phone, but the phone doesn't have a lot of storage and so, they need to be very picky about the things that they can or cannot install and with cloud gaming they don't need to have those concerns as well. So, there's a lot of positive use cases for cloud gaming as a technology as a whole and we're already seeing that since 2019, when there was this kind of second wave of Cloud gaming after the beginning of the 2010s, that it's already a lot bigger than it was in 2019, and in the coming years I expect to continue to grow.

Tobias Heckmann:

Maybe before we go to the next question, I'd like to ask a question regarding your answer.

You said that it's more accessible because you don't have to invest that much, right?

So, how do you think the price structure of cloud gaming is at the moment? Are we at a point where they currently are really offering lower prices than what they would normally need to be profitable to affect many customers or can they keep it in the future if they need more cloud infrastructure for more players?

Market Consultant:

So, whether they are selling the service at a loss or not, it depends, because you have a lot of different services with very different target audiences which have very different business models. So that's why at the start I was asking if you're going to compare within cloud gaming, because you have companies that own the servers, that own the infrastructure on the hardware you have, those that do not do that, and just use a public

cloud. You have those that charge per minute or have a subscription, and then you can just play as much as you want. At some of them you might need to buy the games in advance or not. So, it's very different, and if even if you look into other markets like in Southeast Asia, it's very common to bundle everything in your telco. And so, then you have another middle person inside the whole value chain that also needs to be accounted for. So, whether they are selling at a profit or at a loss, the services right now, it really depends. We cannot make a general statement that covers the entire market.

Tobias Heckmann:

OK. Yeah.

I agree. OK. And between these business models?

So, what we are supposed to do is we initially wanted to focus on exactly what you said: the different business models in cloud gaming, but then we kind of had to shift in a way where we just talked about cloud gaming in general. But between these business models, what do you think is the most promising one to be like a fully integrated player, like for example Microsoft, which offers the entire infrastructure or someone like NVIDIA, who just offers the platform, and you have to buy games elsewhere?

Market Consultant:

So, in general, I am a firm believer that the way forward for cloud gaming to be successful is to not make it an inconvenience. So, if you look at the business model for Stadia, they changed it a little bit after launch, but initially it was a closed system and people needed to buy the games that maybe they already have on another platform to play them there. (...) There was no free way of trying this, even if the service works with your connection or not, it was just very closed and not user friendly.

And what we've been seeing since 2019 is that there has been an overall shift in the industry to make it free to access and then there's going to be some premium tiers or premium offerings that then you are going to pay for that.

So, in terms of that, I look at the „bring your own games business model“, so what NVIDIA does, as something that's extremely user friendly because the people like can already have the games elsewhere and then just play them. (...) And it's been very successful, right, because they've already announced that they have 15, I think 15 was the most recent, 15 million registered users, you have Xbox Cloud gaming that, like they said that they had 25 or 20 million lifetime users that use the service. So, if you look at these business models that try to be a bit more user friendly, it's really more positive and I think that's a way forward.

In terms of who is in the best position, of course, it's very beneficial for Xbox to be under the umbrella of the entire Microsoft company, because then they will have access to Azure and just Xbox Game Studios and everything that they have, that makes them a very strong candidate to really come out on top. When we look at the future of cloud gaming: So, I think that either the „Bring your own games“ or a subscription, that has a lot of really good games in there right now, are the most successful or the most promising business models. But something to also consider is the platform as a service business, where instead of the cloud gaming service charging the players, they charge the publisher, who is putting the game on the service, so they act as a platform for the publisher to just put the games on there and then they can run ads and they get ad revenue between the games that you play or they just make an agreement with the publisher to put the game on there because it's also a way of them distributing the game to a much broader audience. So that's also something that's becoming increasingly popular and especially in mobile first markets with China being a big focus.

Tobias Heckmann:

OK, so this would, just for me and my understanding, this would for example be on the PC market if now Steam would develop a cloud service and then they don't lose anything themselves except the service, but they have the platform and use that to monetize the publishers.

Market Consultant:

It wouldn't be on PC, it's more mobile as I said.

Tobias Heckmann:

OK.

Market Consultant:

Imagine that there's a service out there that just runs the games and the way that happens, that there's a link and you can share the link on social media, it's like your own WhatsApp or own discord or whatever, you just send the link and then you start immediately on your phone. But you don't need to go anywhere. It just runs. And that's very what's based on, like, it's just that word of mouth spreading on mobile.

Tobias Heckmann:

OK. So, it's a lot about convenience, having less barriers, OK.

Market Consultant:

Yeah.

Tobias Heckmann:

Before we continue, I wanted to ask about the time frame. We have a 30-minute slot, right? Or do you have any constraints?

Market Consultant:

Yeah, we have a 30-minute slot.

Tobias Heckmann:

OK, perfect. Then I would say we can go to the second question on the sheet and about the future of cloud gaming, I think this is really about (...) so from our research so far, we have concluded that there are a lot of switching costs for gamers and they're usually also very loyal to the platforms that they currently use. So, will it be possible that they even coexist or will cloud gaming need to be so dominant that they give gamers no other chance than to switch in the future, - let's say in five or ten years?

Market Consultant:

I think right now the market is growing, it's finding its footing and because there is still some skepticism amongst like the core game audience, that don't like cloud gaming because they have invested all this money on their hardware, and they just prefer to play it that way. Then there's some lack of awareness from the more casual audience that maybe they will be playing games on the cloud, and they won't even be aware. But (...) the way we see it, is that right now cloud gaming is portraying itself and the way that it targets the market is just to get to or (...) it's a matter of convenience, it's being there and giving players options. So, you don't need to have a console, you don't need to have a computer, you can just play it this way. So, that's the place where cloud gaming is at right now. It's a complement.

And being a complement and having more and more exposure, we expect it to continue to grow in the coming years in this form, side by side until it just becomes a very normal way of playing, the same way that you play on a PC or console or a phone right now.

Eventually, I think that we might come to a point where we'll actually see a console that doesn't have much inside. It's just a box and then everything is being streamed the same way that you have diskless consoles right now, where you download the games instead of having to put the disk inside and there could be a point in time, maybe the next generation that comes out, there is going to be a normal version of the console, the way we know it right now and a version that's cheaper, that doesn't have as many hardware components inside and is then just powered by cloud gaming. And that's going to be kind of a steppingstone the same

way that we're seeing the Chromebooks that were launched without a GPU inside and other experimental devices out there.

So, I think we're going to evolve in this way and then at some point, the same way that music and video have transition from being in physical formats to being just digital, I think we're going to also see gaming transition into that way. And the key point for this is going to be the rise and the release of, first, cloud enabled and then cloud native games that people cannot play in every other way and that will bring something completely new to the market, like being able to have completely realistic conversations with your NPC's in your game. And that is just completely powered by AI that wouldn't be able to run on a local device.

Tobias Heckmann:

OK, so this is then about locking in the customers on cloud gaming, right?

Market Consultant:

It's on the scenario about locking in because there will be and they're always...

Tobias Heckmann:

Or not locking in but forcing them to get it, to play these exclusive games?

Market Consultant:

Yeah, it's -OK- forcing is a strong word, but it is a big incentive to get people to try cloud gaming and to see that as a viable way of playing games because there is this whole skepticism, this whole very core gaming audience that's very vocal about how much they like to spend money on the hardware that they own. So, it's going to be a gradual process with these different steps. But I do think that at some point in the future, maybe in 15-20 years from now, we will just think of cloud gaming, by being called gaming and it won't even be called gaming, it will just be the way that people play games at that point.

Tobias Heckmann:

OK.

Market Consultant:

But yeah, it's going to go from a complement to kind of a replacement or at least the dominant way.

Tobias Heckmann:

OK, perfect. Thank you. I have one more little question about what you said. So, you said that they will probably have a console without a lot in there, hardware wise, is it not also possible to just integrate cloud gaming into the TV, for example Smart TV's and just have no console at all?

Market Consultant:

Yeah, it is. We already have Samsung and LG doing that. Probably other brands are going to do something similar. The reason why I say that there could be kind of a streaming box next to your TV is more out of just a habit that people have, to be honest.

Tobias Heckmann:

OK, sure.

Market Consultant:

There was that idea, that Sony, ah not Sony. Microsoft was working on a streaming device, a streaming stick. They actually killed the project last month or two months ago. Because they just said OK, we're not going to release something like this right now. They did leave it open to the future to make something like that.

Because there's still some value in being able to run something locally or having some supporting hardware locally, it's just that they could make a cheaper version if they remove some of the pieces that are inside.

Tobias Heckmann:

OK understood. OK. Thank you. Let's move on to the vulnerabilities then.

What do you think are the major challenges in the introduction of cloud gaming or in the market adaptation of cloud gaming?

Market Consultant:

So, at first, it's kind of a chicken and egg problem because you didn't have a lot of people developing games for the cloud. It didn't have a lot of publishers trusting the technology.

And so, they didn't have a lot of games that were kind of meant for the cloud. And then people were like, but why am I going to play on this, that the technology in 2019 was not as good as it is today? And there was more input latency, and the streaming quality was a bit more uneven, struggling with very low bandwidth, especially in emerging markets.

So, three things: technological problems, demand problems, and supply problems.

So, the technological problems: at first the input latency was very high. It's been coming down significantly since then. You have NVIDIA GeForce now with the RTX 3080 tier that has proven that it can have lower input latency than if you're playing on an Xbox Series X. And besides the latency, you also have the bandwidth requirements. At first you have, like very commonly the services asking for 30/35/40 MVPS minimum, or else the connection wouldn't be strong enough. Right now, you have several services that are available in Latin America and other mobile first markets that can function at under 2.5 MVPS. So that's also been improving. And then you have the stability of the connection that's also improving. To all of this 5G is not a requirement, but it's kind of a nice to have because if you have 5G, you have more bandwidth, you have faster speed, so it can improve. It's a bit tricky right now with changing obstacles. So, if you're moving around and there's like a new wall, the connection doesn't remain as stable, as easily as before 5G, but it's something that probably will improve. So, these are technological issues that are already being worked on and where we're already seeing a lot of improvement.

Then you have the supply problem that at first, like NVIDIA GeForce now launched and you had a bunch of publishers pulling the games from there saying 'I don't trust this, you're making revenue without giving me anything. These are my games. How do I make sure that the people are going to play my games in a good quality and have a good quality experience?' But that's shifting because publishers are starting to see the value in cloud gaming and to see why it is important to have the games on there and why there is not really an issue, having the games on there. So, you have the existing back catalog that's already being put out there. You have day one releases on cloud gaming services as well. And in the future, we expect to have the first development effort to make cloud enabled and cloud native games. They're already a couple of cloud enabled games. There was a first cloud native game that was launched by a Chinese company in August. But we will start to see this more and more, so the supply side will also increase.

The demand side: there was skepticism about the technology, that's improving. Because people are just becoming more exposed, the conversation is moving away a bit from the very hard technology.

OK, this is what's going on. People don't care. People just want to be able to play a game. They want to click and play and not have any issues and not even be aware that they're playing by the cloud. And you have Facebook doing this right now. They launched in 2020 and they put their cloud games on the same page, everything the same, you wouldn't be able to tell the difference next to the HTML5 games and that was one of the first attempts to really try to just make cloud gaming normal, completely normal and not even bring up the attention to that, and that has also been changing. So overall we have more exposure and more willingness to try cloud gaming from players so that demand side also improve and without (...), yeah, I think the I answered the question.

Tobias Heckmann:

Perfect. Thank you.

So, we discovered in our research that cloud gaming could be very similar to how TV streaming went and could fragment the market in a way that previously games from almost every publisher would be available on all platforms or almost all. And then there could be possibly a cloud gaming service by Microsoft and there could be an exclusive deal by for example, I think Ubisoft has a deal with Amazon Luna in place - how do you think this fragmentation could hinder the adaptation of cloud gaming in the entire market and how will it play out?

Market Consultant:

I don't think it will hinder the development of cloud gaming and the adoption from players.

This is likely to happen because there will be a content, like a search for content to get people on their service because there are many cloud gaming services out there right now, so it makes sense that some of them will try to get these exclusive deals and you can only play the game here and that will be a user acquisition strategy.

Does that mean that it will be negative for the whole environment? Not necessarily, because you could have struggled in the past. If you look at the console wars, that OK, this game was exclusive to PlayStation, this game was exclusive to Xbox, but right now for most of the cloud gaming services, you can just play them pretty much on whatever service, you can even play PlayStation Now on your PC, and we expect that they will also release some mobile soon and the same thing is true for Xbox cloud game, you can play on any device right now. So, just because it's locked behind a subscription to what was the traditional closed ecosystem, it's not that case anymore because you're not required to have a certain piece of hardware, so it will just be OK. This service has this game, I want to play it. It's really cool. I'll just subscribe. And if we look at what's going on NVIDIA, there are many subscriptions. There are many services out there, but usually people continue to have multiple subscriptions at the same time.

Tobias Heckmann:

Mhm.

Market Consultant:

So as long as the content is good, people will subscribe.

Tobias Heckmann:

OK. Do you think publishers will also go their own way? For example, EA I think is thinking about doing their own cloud service, or is it more profitable for them to have a partnership in place and for example, do it over Microsoft?

Market Consultant:

I don't think EA is going to. There were rumors that EA was working on something, but that was before they put EA Play on Xbox Cloud Gaming, and I think they've also put it on another service.

So, I don't think they're doing that anymore. It's quite expensive to develop the cloud gaming service from scratch and then you have to consider the infrastructure or the engineers that you need for developing their own strategy, find their place in the market too and markets are already quite crowded with big tech companies in there. So, I don't expect them to do that. I think publishers that do want to put their games on the cloud will probably just partner with someone who's already doing it and already has learned from the past years of experience. So even if you think of Activision Blizzard that has been very quiet about cloud gaming and whether they will put their Call of Duties and whatnot on the cloud. If they were to go that way, or even rewrite the League of Legends, if they were to go that way, then it would be in a partnership, I would assume.

Tobias Heckmann:

OK, perfect. Last question regarding targeting. Which customer segments do you think are more or most promising or which geographical market?

Market Consultant:

So right now, in terms of revenue, we continue to see that North America and Western Europe, or Europe in general, are the main markets, and there are a lot of users in Asia, namely in China, but it's a bit hard to monetize them because they're just used to the whole free to play model for mobile gaming.

(...) They have been improving on monetizing those users, but it's been a bit harder. So, for now, it's just typical game markets. There's quite a bit of an overlap: North America, Europe, Eastern Asia with the China, South Korea, Japan probably being the biggest market. But that being said, Latin America, Middle East and Southeast Asia will also grow quite rapidly as they catch up with their potential because they have a massive audience, it's just a bit harder to monetize that.

Tobias Heckmann:

OK. And regarding a customer segment: it's mostly casual players, right?

Market Consultant:

Not necessarily.

So, we have a persona split in our forecast and the biggest segment that we have there is just the mainstream gamer. So, it's gamers who want to play great content, but they want to pay as little as possible for it, as everyone - it's a very common behavior. That's OK. I want to play and have a great experience, but I don't want to pay a lot for it. So, in these types of gamers, there's not necessarily a core casual split. You'll have people from both sides.

Both mobile players and more traditional console/PC players as well.

Natalie Reyher:

Not considering the targeting, I also had a question concerning the Google Chrome books especially designed for the cloud gaming. So do you think this is more to attract the more professional gamers, because like when I saw it in the beginning, I was like 'ohh I thought cloud gaming would be that I can play it on every device and not that I like to buy a Chrome or so to play cloud gaming' so it's just more for the professional gamer. So, what is like the main logic behind it?

Market Consultant:

I think that we shouldn't see the release of hardware oriented for cloud gaming as a sign that people need to buy that laptop to be able to play via cloud. It's just an option for those who might be considering making a shift, or maybe they're just buying their new or their first laptop.

So, they got to buy something. And should I buy something that's completely equipped and costs \$2000 or more? Or can I buy just a cheaper version that has pretty good specs and has a really nice display, but it just doesn't have the GPU and I'll just have to rely on my Internet connection. So, it's more a thing of giving options. It's not saying people to play by the cloud, they need to have one of those. It's not really the point. So, I don't think that the launch of that is targeting more serious players that really want to have the best hardware, because if that's the case then they probably just continue to have their own physical local computer.

Natalie Reyher:

Have anything to add on, Tobias, or to ask?

Tobias Heckmann:

No, no. Super interesting. Thank you, a lot. Thank you very much. Super, Super, super interesting.

Market Consultant:

Yeah, no worries. I hope it goes well and let me know if you need anything else. I do need to jump to my next call so.

Natalie Reyher:

Yes.

Tobias Heckmann:

Exactly. That's why, thank you, and have a nice day.

Natalie Reyher:

Thank you so much.

Market Consultant:

You too, have a good weekend.

Natalie Reyher:

Have a great day. Bye.

Tobias Heckmann:

Bye bye.

Appendix 2

Interview 2

Interviewpartner: Senior Business Development Manager at Tencent Cloud, Male
Company description Tencent Cloud is the Cloud division of Tencent, a Chinese multinational technology and entertainment conglomerate

Senior Business Development Manager:
Hello, how are you doing?

Tobias Heckmann:
Hi, good, thank you for taking the time.

Senior Business Development Manager:
Sure. Let's just jump in.

Tobias Heckmann:
So that is the guideline, let's say. So, I will start with that, and any other questions we can still do at the end. Yeah. So, this is kind of the guideline we have, um. So, first of all, we would like to ask you as ,uh, working in the infrastructure part of cloud gaming: What do you think is the future of cloud gaming in general as a broad overview?

Senior Business Development Manager:
So, I think firstly it's probably important to make a distinction and I've done this before when I've given talks at events. Cloud gaming and cloud for gaming. I think there are still a lot of people, um, not yourselves, but just a lot of people on the peripheries of the industry who don't quite understand the distinction. I work in cloud for gaming, but there is an element of my job which involves cloud gaming as a very confusing thing, cloud gaming is obviously things like stadia and stream arcade, black nuts, and all these cloud gaming companies. Now the reason it's a small part is because, um, it's not really - I don't consider it to be a proven, um, a proven platform. Yet. There have been previous instances, and previous cloud gaming services, which have worked quite well. But Tencent isn't really huge in this space at the moment, and I think that's because everyone is still waiting for certain infrastructure and technological conditions to change. That means, you know, we're talking particularly about latency and user experience, but also content. Content is king and always has been and always will be. You can build the best infrastructure in the world, but if you haven't got any compelling content, any enjoyable games, there's no point in having that infrastructure. So um, the future of cloud gaming, I don't know if you want me to sort of go through your questions, but the future of cloud gaming this year, 2022, has been really quite dramatically changed by, you know, stadia and what has happened to stadia. But it's not necessarily all doom and gloom. We work with cloud providers, cloud gaming providers, who still believe that the future of cloud gaming is healthy, that it's positive and they do have some quite good user numbers. Again, I'll give the example of black nut and stream arcade, which is quite a niche for retro gaming. Um, and actually Tencent has its own gaming solution, which is called Start, but is only operational at the moment in China's domestic market. It's not an international product and it's certainly, from my perspective, there are kind of two ways of thinking about cloud gaming. One is the kind of from a consumer point of view, can I buy something, or can I subscribe to something that enables me to play games on the cloud at home or on the, you know, on a train or something like that? Um, plus from my perspective, a business perspective, can we offer an out-of-the-box solution to developers. So, a developer comes to us and says do you have all of the infrastructure needed to make cloud gaming happen? Let's not call it a product but everything behind it. A stadium product, you know, you can put together a bit like a Frankenstein and make it seem like it's providing a cloud gaming service without actually putting a

label on it. So, that's something that we're tapping into is actually: supporting cloud gaming, but without putting a cloud gaming label on it.

Um, but generally speaking, the future, your first question there, how is the future of cloud gaming to be expected? Well, it's a little uncertain at the moment and to be honest, I think I kind of feel like cloud gaming is growing in generations a little bit like console changes in generations. Um, from ,you know, PS2, PS3, PS4, PS5. I think Cloud gaming is evolving in a similar way. Um, you know people are testing it. Um, but always cloud gaming has relied on the infrastructure around it. So, if you have fiber broadband, great, but it's still not good enough to support a really good cloud gaming experience. I am always gonna play Modern Warfare 2 on a wired connection. Always. I don't see it changing really for 10 or 15 years or more. But that's not to say that there is no place for cloud gaming. You know, in my life, um, maybe I want to use it for games that are not reliant on a good quality Internet connection that doesn't rely on latency. Maybe I wanna play some RTS games or some tower defense games or some FIFA offline. You know, with my son, maybe we want to play just a good experience that doesn't necessarily rely on a good Internet connection.

So, my answer to that would be kind of you know there's a place for it, but it's not gonna replace the console. It is not gonna replace it because it's just it's too reliant on other factors out of its control. Google was reliant on, I don't know about where you guys are, but British Telecom in my, in UK, it's the one that's providing my broadband. You know, ultimately Google is relying on British Telecom to give me good Internet in order to have a good gaming experience. And while that's the case, it's not gonna, it's not gonna happen, but there is a place for it at some point.

Um, so that kind of answers your second question there. Will the future be cloud gaming only? Absolutely not. In my view, it's going to be, you know, I have all sorts of ways I can game. I have even my stadia controller, which is now gathering dust, but I have this thing. Have you guys seen this before? The backbone controller.

Tobias Heckmann:

It's to put on a phone, right?

Senior Business Development Manager:

Yeah. So, this goes around my phone. This is licensed by PlayStation. It's PS5 experience, but for my phone, my phone goes in there, I clip it around and I can play PUBG MOBILE or Call of Duty mobile through my mobile phone if I choose. And I also have my PS5, PS4, Xbox series X, everything like that.

So yes, cloud gaming has a future but it's not going to replace everything.

Tobias Heckmann:

So, to my understanding what you basically said is, uh, there will be still non-cloud games like traditional hardware-based games and that will be mostly for games that are more dependent on internet connection, latency on competitive games as well. And then there will be probably casual games that can be played on the couch and there will be way more in favor of cloud gaming because of ease of access and stuff like that.

Senior Business Development Manager:

Yeah, absolutely, absolutely. And I think, I don't know the sort of nature of your thesis as such, but I suppose at some point you guys need to be considering, let's call it environmental factors that affect games, right? So, if you dig in and I'll send you, if it's interesting, I'll send Natalie a Newzoo report, which I get on a quarterly basis, which is just like an overview of you know, data from the games industry for what it is, Q4 2022.

Environmental factors have a huge impact on games. You know, everyone at the moment is talking about the financial crisis and recession, you know, indirectly the Russian-Ukraine conflict has affected games. China's geopolitical situation with COVID has affected games because Chinese developers are now looking outside of China to release their games because the restrictions inside China are pretty harsh. Um, COVID itself I think has almost affected the need for 5G. So, before COVID, I was commuting on the train every

day, you know, a 5G connection to play games on my phone would have been great. Now I'm working from home, why do I need 5G? What's the point? So, I guess there should be some consideration, for you guys, to consider environmental factors which cannot be predicted to, you know, the effect of the need for cloud gaming, basically. So, do you need to play cloud? Do you need cloud gaming when you're spending more time at home? I don't know. Everyone will have a different answer.

So, I guess in that sort of future section on your document there, um, can game cloud gaming replace other gaming options, or will it remain complementary? I think personally, personal opinion, that it will always complement. Um, other solutions? Other platforms? I think one interesting thing that's going on at the moment is, again, you can look into it, but the partnerships between like NVIDIA Geforce and Black Nuts and even some developers themselves between those guys and like TV manufacturers. So, I know that Samsung has had softly integrated some gaming solutions into their smart TVs. I don't know much more than that about that area, but there would be probably other examples where TV manufacturers are looking for another revenue stream or partnership opportunities with gaming developers themselves. All gaming platforms themselves, offer, let's say casual orientated gaming for families at home who maybe don't have a PlayStation or don't want a PlayStation to play like Crossy Rd on your Apple TV or something like that. I think the key here is, like the underlying foundation, is that Gaming is, you know, very popular, is getting more and more popular and is increasing in the number of demographics that it can, that it can support. So, you know, 10-year-old kids playing Nintendo Switch, you've got stay-at-home mums maybe playing through their smart TV. You've got people like me who are playing their PS5, people on the bus who are making use of cloud gaming services. There's so much choice for every kind of lifestyle and demographic and age that I think, you know it's just gonna complement, be another solution, another way to, uh, enjoy games. I don't think it's gonna replace anything. And that's not just short term, I think that's long-term too.

Tobias Heckmann:

OK. Thank you for answering the future part. Then I have a question regarding to that. So, regarding all of what you said, so basically you said there's a lot of risks involved because of lots of external factors that could negatively or positively influence cloud gaming. As you were working in the infrastructure part, how do you assess the, like, the upfront investment companies have to make, um, is it worth then to just be complementary and now the market is really, really big, but how do you think the risk is in a relationship to the upfront investment you have to make to build up a cloud service with all the infrastructure behind?

Senior Business Development Manager:

I think, well partnerships I think, well inevitably the guys that make the games are not going to be the ones that build the infrastructure. So, they are going to use a partner in order to do that. So, Activision will be used. Our user Call of Duty example, Activision are gonna be using Tencent Cloud or AWS or Azure or Google Cloud and not exclusively, so they might choose a cloud right now, in South America, because they have better coverage, they might use us in China and Southeast Asia because we've got pretty good coverage there and they might use AWS in North America because they have more data centers there. So really, it's going to be about building those partnerships. There's not so much upfront cost for them to consider with the way that games are at the moment, games as a service, let's say GAAS. You know, developers are trying to extend the lifetime of games such that, uh, you know, you don't necessarily have to buy Rainbow 6 Siege every year. You just enjoy it as a subscriber, or you receive the updates every quarter or whatever. And that game has been running for years and years. Developers want huge investments to last as long as possible for a game. You don't wanna build a game, spend \$200 million on it, and then, you know, people stop playing it.

After six months, GTA5 is a good example of that, where they've actually kept initial development costs quite low and then manage the online and DLC aspects of that game really nicely and that business model is such that I think now it's been like 10 years or more since it was released on multiple platforms and is the only title to have been released on 3 generations of consoles. Um, that business model I think is going to become more and more common. And because of that business model, I think that the initial investment is

going to be negligible. People aren't going to worry about that initial investment because it is for the long term. You're not investing a lot of money in a game that people are gonna give up on after six months. Plus, there's another one. There's probably one more thing that's important as more people rely on the cloud and let's say the infrastructure around us, whether that's 4G, 5G, cloud infrastructures, or data centers, more data centers are going to be built every single month moving forward. Anything like that. Gradually the cost will come down. Um, anything that is widespread in the market will be driven down by cost. You know it probably cost \$1,000,000 to build the first-ever laptop. But now that you have a million of them, it probably costs \$100 to build the first laptop. There's the same really with any kind of technology infrastructure once you have more and more data centers, the cost of, um, maintaining those data centers goes down. But here's, I guess, another important point about the environment. Environmental factors are such that it's now quite expensive to run data centers. Why? Because of power. These are the environmental factors that come into play. The geopolitical situation, of course, with the Russia and Ukraine conflict, causes the expensive cost of electricity. So actually, there are some, there's some balance here between like environmental factors going on that cannot be predicted and the overall cost being driven down because it's cheaper and cheaper to run data centers. So that's the kind of, that's the kind, those are all the kind of things that developers have to think about, I think. But, you know, the initial cost for the big guys, for Activision, for Namco Bandai, for all of the major developers and publishers. I don't think it's so much of an issue. It's probably more of an issue for the smaller developers who are more sensitive to prices. And also, I would kind of split your argument here between, uh, in maybe three or four different ways: Paid games, free-to-play games, subscription services, and maybe games as a service. Um, because when the guys that are making free-to-play games have to forecast their revenue it's very, very difficult to forecast when you don't know how many people are gonna pre-order. You know, it's not like you have a shop where you say: oh well, 100,000 people have preordered this game. That's great. That's at least 100,000 times \$20.00" with free-to-play, it's very difficult. So, they have to forecast in a different way. And that's one of the reasons we target it at Tencent Cloud. We're targeting, um, free-to-play developers because they're very price sensitive and we can offer quite a decent price in certain regions. So, it's all part of this huge living thing where one thing affects another and has an effect on another et cetera, et cetera. But I would say that currently, environmental factors are such that everyone is pretty much affected on some level, um, the initial investment costs you mentioned are an issue. But I don't think Activision is too worried about, you know, another \$1,000,000 a month. They made a billion dollars in the first week of Modern Warfare 2. So that's an example where probably they, you know, they look at their electricity bill or their data center bill and they just, they don't care. The smaller guys I think have the biggest challenge.

Tobias Heckmann:

OK. Can you quickly explain again to me um that you said, um, I think free-to-play games, of course you don't have to pay, you pay for in-game transactions then you have games as a service and subscription-based. I didn't quite get that differentiation yeah, so.

Senior Business Development Manager:

Subscription would be probably the newer one where you have like a battle pass. So, a couple of examples of that would be, um, Clash Royale. Other ones I'm familiar with would be Cricket League from Miniclip. Where you have like it's like \$4.99 a month and you get extra rewards, et cetera, I think you have to look it up. But Grand Theft Auto also implemented this about six months ago, where you can pay, I think like \$10.00 a month to get extra money in the game or something like that. That would be like a dedicated subscription service for the game.

The game as a service would be more like um, Warzone I guess, where you can just buy items when they're released and choose to do that. Uh, you pay an initial cost. But then you get either a discounted option to buy weapons or extra combat gear or whatever in the game.

So, they're all very similar business models, but all slightly different and they all have slightly different needs. Um, and yeah, I think people are moving or considering at least more the subscription model. And

we all know that, you know, more people are monitoring their subscriptions at the moment because everyone's got Netflix and Disney+ and all these other ones and are now considering their options. So, it's a very, very competitive market to be in, um, when considering, um, you know what business model to choose.

Tobias Heckmann:

OK, perfect. Um, I think then we can move on to the next big part. And so basically the question is what are the biggest challenges/ problems and how can they be overcome? So, we're talking about cloud gaming specifically for this.

Senior Business Development Manager:

Yes. OK. Yeah. So, like I said, I don't, I don't work in the cloud gaming team, but in their space. Um, the biggest, the biggest challenge by far is content. Um, you know, I can't emphasize this enough. This is why, um, like no one is playing games on Netflix. Because the games suck basically. And you don't, you know, just to be, I don't wanna be unfair to them, but you don't need a well-known IP, and you don't need a well-known brand in order to have a successful game necessarily. You just need good-quality content. And guess what? The people that know good quality content and how to create it are the game guys. That's, uh, either have a very good experience or and have worked at, you know, previous studios or are very creative and bring something new, bring something fresh, bring some new content or some new way of interacting with content. So, I don't think rehashing a match three-game on Netflix is gonna do anything for them. I want to see new content. And again, this is why stadia failed. Because why would I, why would I pay \$49.99 to play Assassin's Creed Odyssey on Stadia when it's in Game Pass or whether it's in PS Plus? It's just crazy. Um, so they got their strategy completely wrong. Content is king and always will be.

And I think Tencent is at a kind of crossroads now maybe where they have to decide whether to pursue it or whether to bin it and come back in, you know, four or five years, if it was up to me. Yeah, it's not happening on any scale anytime soon. Um, unless you can find some killer content, um, because if you look at the kind of some of the trends in the past software always sells hardware. Always. And it's the case for, you know, I mean Microsoft, as soon as they released office, they just sold like they could have given laptops for free, you know, Halo, it sold Xboxes. You look at every single platform, it's the software that sells the hardware. So as soon as you've got killer content you've got no problem. So, relating to that, so, we think that the gaming, uh, or cloud gaming industry, or not, let's just say the gaming industry in general moves very similar to how, um, TV streaming moved a few years ago where we have or we where, we had, for example, this night based previously it was integrated into Netflix then they branched off, did their own thing, um, and currently, it's similar. For example, I think EA is in Microsoft's cloud gaming Game Pass included.

Tobias Heckmann:

But you say content is king. So, in that regard, we think that, um, all these publishers with the big franchises, they have the biggest power in the market, and could you see them splitting off, doing their own things like it from a cost perspective, what do you think? Also, uh, like for example, partnering with the cloud for gaming service, what makes sense for them? Or is it more sensible to stay inside that big Microsoft player?

Senior Business Development Manager:

Um, I think they will probably dip their toe in. That's it. They will never release the next Assassin's Creed exclusively on the cloud. Never. Um, because they're trying to minimize their risk. Big companies like that, you know, the AAAs are always trying to assess their risk, and they will never put all of their resources into any kind of platform that isn't proven. And why would they move away? Why would they move away from the next Gen consoles when they've just made a billion dollars in the first week of Modern Warfare 2? Um, so I think it's a couple of things really. They are interested in moving that way, but they're moving very cautiously and they're not gonna commit a huge, huge number of resources or money to move into a platform that's not proven. Um, so yes, Disney split and made their own streaming platform. The problem I have is, and I'm not, you know, not sort of picking your point apart too much, but the problem I have with people

saying that cloud gaming is like, you know, Netflix for games. It's really not true because you don't interact with Netflix after you press the button. It streams, it streams content to you, and you enjoy watching that content and you finish, and you might watch another episode or something. It's a very passive experience. Cloud gaming is not a passive experience, it's an interactive experience. Yes, it's under the umbrella of entertainment and streaming and requires similar infrastructure but you're not interacting with strangers' things or whatever you're watching. You are providing a one-way experience. So, Netflix for games? No, it's not. It's far more complicated as soon as you press your trigger. You need a response or a reaction within one millisecond to know that you are having a good gaming experience. Until that happens, I'm very skeptical. It's not to say it won't happen, or it won't happen for some games, um, but I think it's dangerous to compare streaming services with game cloud gaming services.

Tobias Heckmann:

OK. Yeah. So, the biggest challenge is latency still, right? But if you look at the gaming, uh, Industry in general. And now our focus is cloud gaming, but with cloud gaming, the video game industry also simultaneously moves into subscriptions having its own platform for games. And in that regard how do you see fragmentation happening with for example Microsoft, PlayStation, um, I know NVIDIA is quite open. They're not really, uh, restricted or locked in. But for example, we have EA, Amazon is launching a service. How do you see fragmentation in there and will customers adapt and buy-in, or will they say no, it's too many different services that I would have to get to have the experience that I previously had. We had access to all games.

Senior Business Development Manager:

Yeah, that's a good question. Um, I think for me, if you require someone to buy or get hold of another controller or another device, it's really challenging. Because you either have to give that device away for free, which actually Stadia did, you ended up doing at the start, I think it was like 100, and it was like \$100 for the controller and the Google TV dongle or whatever and you had to invest money into the service. Um, I mean, the key is going to be, when people get it on their phone, right? It's a device. There are a billion smartphones in the world, if you make a compelling cloud gaming service for mobile, where people don't need another device, uh, they don't need anything else than the device that they already use, I think that's gonna be pretty compelling. Um, whether it happens? Uh, who knows? I think again, if you can, um, deliver, uh, a good experience on mobile or your iPad, uh, comparable to what you enjoy in your living room, that's great. But I'm skeptical of anything else working at the moment. I don't think we'll see, so I mean Tencent is very much in this space, I think in terms of how the games industry is consolidating, um, by consolidating I mean basically a form of globalization where lots of companies, one company buys up lots of other companies and then ultimately, it's difficult to work out who owns who - and if you look into some examples like the embracer group, you may have heard of a Swedish company called Embracer, they have like 100 studios underneath them and some of those studios have studios underneath them. It's a very complicated hierarchy. So, I think, I don't think that that's gonna change anytime soon, but the fragmentation will happen when someone has a compelling use case. So, someone brings out, you know, I don't know, Disney brings out their own Cloud service of some kind and there's a break-off, but I don't think that it's, I don't think we're gonna go in reverse. I don't think companies are gonna split apart and create different content that way. You know, on their own without there being some kind of trigger.

Tobias Heckmann:

OK. Then let's go on to the next question. So, regarding Tencent cloud in the past years, we know cloud gaming is very, let's say, it's still in the early shoes and things are changed and adapted quickly. Um, has Tencent Cloud changed anything in the business model since the start, and if so, what was it?

Senior Business Development Manager:

Not really. I guess you guys should try and speak to uh, maybe an American, someone at an American company and compare the difference because my company being Chinese is very integrated into Chinese society. We have actually not experienced very much growth in the last two or three years. In fact, you may have read about some of the restrictions that have been applied to areas that Tencent is working in, restrictions, not only you know, international trade and company stock price, et cetera, but also restrictions into kind of curbing the amount of time that, um Chinese youngsters can play on games, for example, it's restricted to an hour on Friday and an hour on Saturday. Um, so I'm probably not the best person to ask to answer that question. We haven't experienced much growth, um, in the last few years, of course, we're working in things like Metaverse, Web3, up-and-coming technology, things like that. But I haven't personally felt at Tencent that we are growing at a rapid rate at the moment. It's pretty stagnant and I think until some of the geopolitical conditions change in the next six months, that's not gonna be any different. And I'm hoping personally that China changes its policy slightly, um, you know, maybe next year, um, but until then really, it's been pretty flat line, you know, in terms of growth.

Tobias Heckmann:

And then let's just uh, jump to jump a bit to the last question from there because it fits um, so which geographical market is you think is most promising for cloud gaming?

Senior Business Development Manager:

Well, I would have to say emerging markets, um, depending on their individual infrastructure, because emerging markets have the most smartphone devices per person that don't have a gaming device at home. So, you think about markets like India. Uh, comes to mind, especially because uh, huge population of gamers, but most people are gaming on their phones. So, I would probably limit my answer to that: to India and Southeast Asia, which is more of a mobile-focused market. And I would say that the most promising contenders for a really good, enjoyable cloud gaming service would be India, the subcontinent, and parts of Southeast Asia like Vietnam, Thailand, and Indonesia.

Tobias Heckmann:

OK, OK. OK. And we already talked about customer segments, so we don't have to go over that. I think, um, so for the most interesting question, um, I think, how could the cloud gaming business be changed after the weaknesses we talked about, um, after you set out the future, but do you have any idea how, how the business model, in general, could be improved?

Senior Business Development Manager:

I think, you know, trying to think positively whenever there is a product or service that has failed, everybody learns from it in some way and learns the mistakes they made and then moves on and tries to improve that product. So, you could probably find examples elsewhere in the technology industry as well. You know Google is, unfortunately, now pretty well known for releasing stuff that doesn't work or doesn't do the job it said it was going to do. You think about like Google plus, and there are probably some other examples like Google Glass, Google Stadia, you know, all these types of stuff. So, but I, you know, let's not be hard on Google because they're putting stuff out there. They're trying to be innovative, and they're seeing if it works and yeah, they're almost like trying to be innovators. Google Glass was probably too early, and maybe Apple's gonna release something that's even better, and maybe they don't get it right. And I kind of think that cloud gaming is a little bit the same when there's OnLive, I think during the PS3 era and then PlayStation bought them, which became PlayStation Now, and then, they haven't kind of really got that right and they've changed it. They've changed the PlayStation subscription levels, and tiers to reflect a kind of new cloud gaming experience, and Microsoft is doing something similar. Um, Stadia died this year, um, you know, I think every kind of innovation and generation that, you know, where there is a product released for cloud gaming, people take note, they learn, and they innovate again. So, I kind of think that someone will do something more in the next few years that will be more innovative, it will be more different. And they might

have listened and learned from all the reasons why everyone, why stadia didn't work. Um, so there's a place for it. It's just not in its current form. Really so. Yeah, trying to be positive about it.

Tobias Heckmann:

OK, I'm and as I said in the beginning, I made some, uh, questions from your initial um introduction. Um, I for example note that you're working in the cloud for gaming. Do you think these services, if you look at the value chain of for example Microsoft or Sony, does it make sense for them to acquire the company that does it exclusively for them, or is it more valuable for them to look: OK, who has the best conditions? Who has the best technology? And then we change based on what the market offers?

Senior Business Development Manager:

Yeah, to acquire a company, a cloud company would be pretty difficult because you know, it would be pretty expensive. It probably makes more sense to use them as a service provider. The only exception I can think of to that would be when Ubisoft bought a company called I3D. Um, they are, they provide a similar service. Not identical, but similar service to us. And Ubisoft now owns that company. But then Ubisoft is a big publisher. You know they have 30 studios across the world, so they can probably justify that. Personally, no one is gonna come in and buy Tencent cloud because it's owned by Tencent. No one is gonna buy AWS because it's owned by Amazon. No one is gonna do anything with Google Cloud because it's Google. And the same is for Azure with Microsoft. Maybe there's a smaller cloud provider out there that does something different or has access to a partner network that no one else has, or it's some regional benefit where they have an exclusive relationship with a local telco provider or something like that.

Maybe. I don't know, um, but I would say it would make more sense to use us as a service provider. I mean, ironically, our customers are using us as a subscription service kind of, you know, so they're like a blueprint for what the gamers are actually doing themselves. We're billing them for their service. So that kind of model is working at the moment, and I don't really see that changing. It's far easier for them to use someone else's infrastructure than make their own because they want to concentrate on what they're good at, which is making games.

Tobias Heckmann:

OK, perfect. Um, but you already, you already said, uh, that Tencent has their own cloud service. Amazon, Google on the cloud service, cloud for gaming service, uh, Google, uh, Microsoft. But then in that sense, they already do own these services and then it makes sense for them that it's integrated, right? So, they have some advantages to that.

Senior Business Development Manager:

Yeah. So, all of the X cloud stuff on Xbox is running on Azure. The Stadia stuff was probably running on Google Cloud or a partner network. Um, you know, Amazon Luna is probably gonna run on, uh, AWS and you know, Tencent Clouds Start is probably gonna run on Tencent Cloud. So, we all dominate the environments that we work in. But the interesting thing is that there are always some exceptions and we're not as strict as competitors, as competitive as you would have thought. For example, I think Amazon Prime Video and Netflix are running on the same service. Even though arguably they would be competitors, Netflix is using Amazon to stream its content. So, there's always some anomalies in here and, you know, we do actually work with some of these so-called competitors, with partners. Supercell would be an example of that. Supercell is having a suite of global games. And we have to work with Google Cloud and Azure as partners because that's what Supercell wants, so they don't use us exclusively. So yeah, everyone has their own little silo, um, but I don't see that, I don't see that changing personally.

Tobias Heckmann:

So, this, what we called it in our research, was coopetition. So, cooperation and competition. So, uh, do you think that this is also important too then, to cooperate with the competition to advance the overall product and make cloud gaming as a whole more acceptable?

Senior Business Development Manager:

Yeah, absolutely, absolutely. I mean, but ultimately everyone wants to make money, and sometimes having that competitive edge will benefit everybody. I mean, I think of like, sometimes think of it like tennis players, right? If Roger Federer didn't have Djokovic or Nadal, he probably wouldn't be as good. Because they're constantly pushing him, right. So, I'm, you know, it's a good thing, I think because everyone is trying to innovate, do a little bit better, do something different and ultimately win. But, you know, at the end of the match, Federer always shakes Nadal's hand, right? It's so, I kind of think in the games industry especially, everyone plays nice. We all realize that there are other options. We all realize that we all want to make money. But we'll go to the same trade shows and exhibitions and stuff, so it's all fine.

Tobias Heckmann:

Perfect. Makes sense.

Senior Business Development Manager:

Alright, thank you, thank you. It's nice chatting with you. And like I said, feel free to reach out if you need.

Tobias Heckmann:

Thank you so much. Have a great day. Thank you. Bye.

Appendix 3

Interview 3

Interviewpartner: Gaming industry manager at Google, male

Company Description: Google has its own games division called Google Play Games and launched the cloud service Google Stadia which will be shut down in January 2023.

Julia Pritzl:

So, regarding the future of the gaming and the cloud gaming industry, what do you think will the future of the gaming industry look like? And maybe more specifically, what are the most disruptive developments?

Gaming Industry Manager:

OK, good question. So, um, if you look back on the history of games, it's very tightly linked to what we call the form factor.

So basically, the highest performing device of the time is kind of dictating the types of games that can be played on it. And this is pushing the industry further.

So, you know, you can go back to like the first, you know, arcade machines and then you can go to the home computer and the first home consoles and then in the last 12 years mobile grew to become just over half of the whole industry.

That's the biggest shift in the last 12 years, because it means that game studios can go to market much cheaper and directly to the to the users. And it increases the total pie, let's say, of the gaming market.

When you look at it from a perspective of how to make money, the arcades and stuff, they were, like, effective ways to make money. And then when we moved to the kind of more PC or console model, this is, you know, more like cinema or music album sales, it's a bit more difficult to capture the value and you must sell bigger things and with a lower frequency. But mobile kind of changed that and you know, allowed developers to really like maximize value. So, if you look back like 20 years, I think that's definitely the biggest shift.

Now if you kind of break down the history of mobile gaming, there are kind of like 2 clear waves and now we are kind of in the early phases of the third, and it is really unclear where the next kind of wave of growth will come from.

And loosely, it's like five years of the stores driving growth. So, the App Store on the iPhone and the Play Store for Google, you know, it was just days where you, if you were able to make a game, you put it on the store and basically millions of people were playing it overnight. Right then, competition increased and that became tough, but then things like Facebook ads and Google ads became really, really, good. And so, companies who learned to use this well were able to basically make a money printing machine. And let's say, five years after that, this was the most effective way and really, really pushed the industry quite far.

But since last year, when Apple announced new privacy changes around the app, transparency, tracking transparency and this made it, this basically broke the growth engine. So now we are in a phase of companies like trying to find a way to grow and going to market has become more expensive because you can't just put your game on the store, and it will just magically get downloads. You cannot pay your way to the top anymore because it's more difficult to find the right kind of users. And so now we are, we are in a place where the market is seeing a lot of consolidation, some of the biggest acquisitions in gaming history happened this year, right. So that's like the disruptive developments.

And then when it comes to good cloud gaming, I think everyone can agree that it's like an awesome opportunity. Because if you go back to the form factor argument, you are basically saying like OK, there is a power, a computer with basically infinite power, which is like Google Cloud or Amazon Web Services, where you can run your game and then stream it to a browser. For example. So, this can fundamentally change the nature of what kinds of games you're playing because you are basically no longer limited by the power of the computer you are running on or the phone you're running on. So, I think there is like something to be done there but it's still early days and you probably know the story of like Google Stadia which tried and then stopped, right? So, there's parts of the puzzle that need to be solved, namely just like people's Internet access speed, like it, you know, we don't have like 5G everywhere yet. And you know, developers need time as well to learn what kind of games will work well.

And then I think it's also like a productization challenge, so you know, someone needs to go to market with a compelling games catalog, a compelling, player experience that maybe is still not discovered.

That will kind of shift players away from running games on their computer or their phone to running it in the cloud.

Yeah, sorry, a bit of a long-winded answer, but I think we got there.

Julia Pritzl:

Thank you very much. Now a lot of input is really good, so long answers are good. So, kind of connected to what you were saying, can you imagine even though probably hard to predict now, but that there will be a sort of like a cloud gaming only future? Or that there will still be in some way hardware remaining?

Industry Gaming Manager:

I don't think it will be only cloud gaming. I mean, you know, there is always going to be a niche of like nostalgia driven players who are, you know, still playing some old school games on like a Commodore 64 and they exist today, and they are still playing these games.

In theory it could be interesting, like it could happen, right? For example, I grew up playing Pokémon on Gameboy Color, and I played on my phone.

But it's, you know, I don't need the Game Boy, I just have an emulator on my phone. So, there's no reason why you couldn't have an emulator for a PlayStation 2 in the cloud and you know, play your favorite PlayStation 2 game via cloud gaming service, like there's no reason why that can't happen. But then I think it becomes a matter of like is there going to be a market for people playing offline, is there going to be a market for, you know, people playing or there's a chunk of people I think, who really want to own their games. You know, they are maybe not so happy renting it, but you know, that's back to like productization of how, how will it go to market? Well, they will be able to offer something that makes it really feel that you can own it and change cloud service or something, I don't know. But yeah, short answer I think it will be probably complementary, but it could be a big chunk of it.

Julia Pritzl:

Yeah, it makes sense. Thank you. So maybe then we can already move on to the vulnerabilities and I think you've mentioned some point definitely with the productization or that people maybe want to own their games, that there's still some nostalgia connected to the hardware also. Now, however, when you are thinking back to Stadia and what do you think were the biggest problems or some challenges that had to be or should still be overcome?

Industry Gaming Manager:

One big challenge is oftentimes the people who are providing cloud services are not like native game developers. So, they don't fully appreciate how hard it is to build a game like building games is a notoriously complicated process. It's very chaotic. Maybe you go for two years, you cannot show anything and then suddenly, bam, it's like all come together. But it's a very iterative process.

You need good developer tools to like to create, to code, to debug. And if you think about like the average game, like right now I'm playing on PlayStation 5, it's like 100 gigabytes. So, imagine like a developer working remotely during COVID, trying to upload a new version of the game every time they need to make a small change. And pushing 100 gigabytes to the cloud from their house? That's just not workable. The whole tooling around the developer experience is super important and super tough. Then it's also hard to estimate like how expensive it is to what we call a port.

Again, so today if you have a game that works on say a PC, and you want to make it work on a phone, you call that process porting. So, porting a game to Linux, which is, you know, where Stadia is running on. I mean this can cost like \$1,000,000 easy and you just don't know how many players are on the platform, you don't know if they're going to buy your game or not. So, you know it's like a steep investment. And nowadays Windows is still king and in the AAA game development, so this is like high fidelity console quality games. Umm, and it's also in terms of development, I think we underestimated how many people genuinely actually work on these titles. You have the physics specialist who decides like how does the rock you just broke, like bounce, right? You have the texture specialist who decides like how does the rock look and feel and all of this. So, you really have like tons and tons of people working on this. So having like good tools is, is a is a critical one.

And then the other kind of sites are more like business related, but you know having a strong games catalog is important. Most people will try a new platform because they want a game. And I think Google specifically got unlucky because they had a really strong offer when Cyberpunk 2077 came out, which was like the most anticipated game for a long time and they had you know 50-year-old men. You get the game, you get the cloud gaming service for free, you get the controller for free. But the game was like basically a flop, so you know all that effort kind of went out the window right because people like didn't care so much for the game in the beginning. So, you know that also was tough. And then the third one would be just like average Internet speed. Sometimes, like the remote control would drop off because Wi-Fi is a bit spotty, right? So, if I lose a game of FIFA because of that, like that's going to annoy me and I'm going to quit.

Julia Pritzl:

Yeah, that basically already ties in with the next question.

What are the measures that might be undertaken by the companies to deal with the Internet speed issues or connection issues. And I mean as already mentioned in the beginning, I think then roll out of 5G will make a difference, but what other ways are there?

Industry Gaming Manager:

It's tough because the cloud companies don't own like the middle layer. So, you know, Google owns the cables growing like across the world. Like the whole world is connected by basically like one giant Google supercomputer. But then going to your house, it's like a local telecom player. And you know, the Wi-Fi machine is another player, and this can have like a huge impact on the quality of your connection. So even though you have like a magnificent computer where the game can run and execute super, super fast. Your experience is still going to be kind of capped by that hardware you have at home and the kind of quality of the speed in your building. We are talking like multiple gigabytes per minute, this is the amount of data that needs to be moved. So yeah, it's super challenging.

Julia Pritzl:

I see. Maybe that is also connected to that. And then the game development aspect you mentioned earlier, because we found some research or some recommendations that basically stated that in the cloud there can be games that are maybe too large to be played on a traditional PC because they take up so much space, for example, in terms of the download or whatever, but will this, I mean all of the issues we've just discussed, will they hinder that development then or is this sort of promising?

Industry Gaming Manager:

I think it's an advantage because like the best computer you can ever imagine having in your house is never going to be as good as, you know, Google's computer or Amazon's computer or Microsoft's Computer. Like you're just, like no single person is going to win that particular race. So theoretically, the kind of games that can be made on cloud, are like almost infinite, you know, it's beyond our imagination. And so, once Daria started, we hired like Jade Redmond, who made Assassin's Creed, who is like a superstar and you know, we kind of told her like make something that never has been made before, but then, you know, just like the progress of the platform adoption was not good enough. And these projects are super expensive and take long.

Julia Pritzl:

I see. OK, thank you. Then maybe at this point we can move on to the next chunk of questions which are a bit more general and business model related.

So, regarding your time at Google or maybe just in general, and maybe we've touched up on it when you were outlining the history, but what were maybe some major industry changes that you observed?

Industry Gaming Manager:

Yeah, so definitely like #1 you know the smartphone #2 the stores and #3 just the advancement of ads and targeting technologies because basically this meant that marketer's people who decide where ad money goes left the machine-AI to decide where their ads are shown.

And the machine found that your attention is worth basically the same amount if you're playing a game or if you are reading the newspaper. So, before this targeting you know, the trend in media was to make very niche content, like for example, for young mothers because young mothers changed their consumer habits. And so, advertisers know that this is a good time to advertise to you, I don't know, baby food because that's when you're most likely to change your behavior when it comes to what baby food you buy. So, when we kind of understood that ohh like we can still kind of figure that out, but we can show you an ad on a YouTube channel or in a game, then that whole ad space became a lot more valuable and so suddenly the power shifted to people who can keep your attention for long.

And so actually the kind of evolution of the ad industry in general made a huge impact on what kind of games are built. So that's that one. And then, the last big change is clearly this transparency app tracking, transparency framework. This is like changing the game right now and then probably in the last year and a half or two, everything like web 3 related, you know, NFT games, all that stuff.

Julia Pritzl:

OK. Yeah, very interesting. Um, new developments for sure and I don't know since this is maybe also more your area of expertise, can you tell us a little bit more still about like how maybe then add placing or ad space and gaming works or yeah, something related to that?

Industry Gaming Manager:

Um, yeah, So what? What? What exactly do you want to know? Maybe what type of asset code then?

Julia Pritzl:

But for example, how could it look like in cloud gaming? Or how could it be implemented there? Or how was it maybe already implemented?

Industry Gaming Manager:

OK.

So, I think the ad story is quite particular to mobile phones because it was like for many years, like a perfect measurement environment. I could know that you were playing this game and then you clicked on my ad and then a month and 1/2 later you spent money on the product that you clicked the ad for. And so, I was able to value the ad space in Game X super accurately.

Um, in a cloud gaming environment, I guess it would be more difficult because you could be playing the same game on your computer, on your TV, on your phone, and so then it would become more complicated. Like what kind of ads are you interested in seeing there?

Do you even want to see ads in this kind of environment, or is it going to be more like high quality experience that you're paying for up front?

You know, or maybe somewhere in the middle like FIFA, where you pay up front and then you also keep paying to like, unlock players you want and like. People seem happy about that, right. Or maybe not happy, but they keep paying for it.

So, it's hard to speculate how ads would look in cloud gaming. I've seen a lot of, you know, attempts at like placing ads in a kind of dynamic 3D environment, but the moment you do that, you kind of lose the performance aspect of it and that's really what drives the value, so maybe beyond some kind of branding opportunities that are like, you know, more loosely measured and it's more about like measuring how many people have seen it as opposed to was it valuable or not, and I don't see that becoming like massive.

Julia Pritzl:

OK. Yeah. All right. And then thank you for sharing your point of view on this. Maybe on a final note then, we can talk a bit about targeting as well. So, um, since the player demographic has been changing and changing, I think a lot over the past couple of years and I mean, which geographical markets seem now most promising or which customer segments?

Industry Gaming Manager:

So, I mean, biggest gaming market in the world is China, but it's really hard to publish there because they are really strict about who can publish, and they have like all sorts of limitations and rules.

And that probably would not be the first place you go to. And East Asia has the most gamers. So, Korea, Japan, so probably something like Korea would be interesting.

Then the US is obviously always, you know, a massive market. So that would probably be the first or second. But then, you know, for cloud gaming specifically, you would need other considerations like Internet speeds, what kind of games you can bring there. People. The game still playing in Japan are very different to the games people play in the West. And then in terms of like customer segments?

Like, billions of people play games, but very few people call themselves gamers, right? Like the highest spending demographic is women 45 and over for mobile games, because they play Candy Crush, they play Little Garden, they play, you know, Royal Match and they spend a lot of money there.

But probably if you're doing like a super open world kind of experience where you need to sit down and play for hours you're not going to go for that segment, so you know, you can probably go for the more stereotypical self-identified kind of gamers, which is young males, basically.

Julia Pritzl:

All right, thanks. So, because for our analysis basically we decided to look closer at the North American market since we saw some figures that basically stated that it will be the largest market at least in the next few years. Which is why we decided to focus on that one. Um, and then maybe related to that or knowing that bit of information, um, what do you think in future time will then be the most dominant demographic?

Industry Gaming Manager:

I think it depends entirely on what kind of experiences are out there, you know, the hard thing with like cloud games or HTML5 games, is that it's really describing more like a technical aspect of how the game is running, but it's so like the scope is so big because it could run anywhere, and the user might not even realize that it's changed.

So, you know, if tomorrow Candy Crush decides, hey, we're going to run like a super crazy AI that is generating the level as you go and, you know, it's like adapting the difficulty, like at every move, and it's going to be like the most joyful experience ever, then they might choose to run it on the cloud and stream it

to your phone. And you know, the most dominant demographic might be what I just said earlier, right? Like, older women.

But if it's, you know, if it just becomes like a bigger version of Fortnite where instead of like 30 players it's like 300 or 500 or 10,000 players, then, you know, maybe it's going to be young boys. I don't know. It depends entirely on the kind of games, what you call games and where they do best.

Natalie Reyher:

I just had one follow up question to Google Stadia. Are like Chromebooks now the way to go for Google, like to be in the cloud gaming business? Because they said they have this Google Chrome book, where you can like play like GeForce now and other stuff like different cloud services through the Chrome book?

Industry Gaming Manager:

I don't really know how core it is to which product are strategy, to be honest. Umm.

Yeah, I'm not sure. I mean, you know, it's a computer designed to run Chrome OS optimally and like Google is a, you know, obviously like a really big believer in cloud computing, so in the same way that like a Pixel phone is meant to show what an Android phone can be, I think a Chromebook is meant to show the market like what cloud computing experience can be, and hopefully that at some point converges with the kind of quality of like a MacBook Pro that, you know, I'm using today because it's still like the best hardware out there.

But yeah, I..., don't know how the Chromebook strategy feeds into this specifically.

Natalie Reyher:

Ok, thank you very much for your time and very interesting insights.

Appendix 4

Interview 4

Interview partner: Frequent gamer and IT bachelor student, female

Natalie Reyher:

Hello. So, first of all, it would be super kind if you could explain a bit, um, your background like your bachelor studies because I know you study in IT. And then also like what type of gamer you are because yeah, I know that you like to game a lot.

Frequent Gamer:

All right. So hello, yeah, I study computer science. And I did a couple of internships in some areas, for example in cybersecurity and XR or VR/AR. And so, I have an interest in gaming as well, and I would consider myself a regular gamer, so also, I tested a lot of games, I'd say so. For example, I like to play first person shooters, but not so regularly. More often I play computer games where you have to interact with other people online. So, for example, I play a lot of League of Legends or Counter Strike Go. And yeah, that's what I would consider myself.

Natalie Reyher:

OK, so, uh, very interesting. Could you tell me how often per week you would say you play and then for how long?

Frequent Gamer:

Actually, I almost play every day because I like to play with my friends, because they also like League of Legends, and you need five people at least to play the game with the other five people. And it's not so fun if you play it with random people on the Internet. So, we like to play as a group of five. And yeah, as I said, we all like the games, so every day we play for like two hours. Also, because one game could last one hour, so maybe two games a day. Now it's up to two hours and there are a couple of days when I don't play League of Legends. But yeah, I'd say it's very regular.

Natalie Reyher:

OK, very nice to know. So, you said the kind of games you play are online games that you can play connected with others, right?

Frequent Gamer:

Yes. So yeah, the gist of it is that you play against others anonymously. You know players, so it can get a little toxic there. I prefer playing online rather than just by myself.

Natalie Reyher:

OK. And so, on what device do you like to play? Do you have a PlayStation or an Xbox or do you play on your PC?

Frequent Gamer:

Sometimes we play on a switch, but then we don't play League of Legends or ego shooters. So yeah, rather we play mini games like Mario Kart or something else, but for regular gaming, I do use my PC and I'd say it's, yeah, a little bit of a gaming PC as well because I have a good graphics card which also supports RTX. So, I'm really fond of, yeah, exploring RTX games. And yeah, unfortunately League of Legends doesn't support it. But yeah, I'd say I have a very good computer for gaming, so I use that.

Natalie Reyher:

OK, very interesting. So um, did you like to buy your computer specifically for like gaming or did you like to add, I don't know, some technical stuff? Technicalities to better game? Or did you already like have a good gaming computer because you study IT?

Frequent Gamer:

Before I only had a laptop and then I decided to buy a computer which also supports, yeah, gaming especially because otherwise it could have just used my laptop for office stuff. And then I also decided to go with the better graphics card so the gaming experience would be better. I bought it in 2017 because it was a really good one at that time and so I have a better gaming experience even though League of Legends doesn't really need that high of a graphics card. But as I mentioned before in the other games like for example Wolfenstein, which is a single player mode OK game mode, that could be beneficial if you have a better graphics card. And that was what I was looking for.

Natalie Reyher:

And could you, like, just tell me if you like to play via subscription or like um, I would like to know for example where you play like League of Legends or your other games like how do you access them?

Frequent Gamer:

So, I have two main, yeah, access points I'd say. So, for once I use Steam as a platform where you can buy games and also can trade. Yeah, stuff you earn in games for example. There is still, yeah, I'd say a library or market rather in CS Go where you can sell and buy chests with loot. Umm, so, but I use it more for, you know, single player games and every time I see something on my wish list, which is at a reduced price, I look at it and maybe I buy it or maybe not, but League of Legends for example, I got it from Epic games. This is also a store where you can buy games, but League of Legends is for free only. Yeah, you can only pay in game loot like skins or additional they're mostly skins or question quests. Yeah, so League of Legends is for free and the other games I bought.

Natalie Reyher:

So, you said Steam. Uh, do you also use the cloud service from Steam?

Frequent Gamer:

Actually, I don't buy games that often, so I haven't used any cloud service from Steam and I'm not sure if there's one specifically cloud gaming service from Steam, but I only use the store from Steam to just buy the games.

Natalie Reyher:

OK. And then you, like, buy them online and download them, correct?

Frequent Gamer:

Hmm, right. There's also every week in the Epic games store, there are games for free. And I always have a look every week to see which game it is and then just get it for free. And if I want to try it, I download it same as in steam. So, if I buy it and download it I yeah, then you can try it. Or you can also resell it or sell it if you don't like it.

Natalie Reyher:

OK, it's definitely very interesting. And would you say that downloading games like that takes a lot of time or something?

Frequent Gamer:

I don't know, it's somehow an inconvenience that you first need to download them and that you cannot directly play. Hmm. Actually, yes. I'd say this when I lived in my other apartment with a less, not so fast Internet connection it takes like, I don't know, six hours at least to download one game.

And you know, this takes a lot of time because if you play it, if you buy it, you want to play it directly and like on time. And so, you don't want to wait that long. And especially if you want to play it with other friends and they have a better Internet connection and you feel like, OK, well guys, I have to wait six hours until we can play.

Natalie Reyher:

OK, I see. And um, like the games that you download, you can only play them on your PC and laptop, right? You cannot play them like on your phone or on your tablet or whatever?

Frequent Gamer:

So, I have access to the games I bought, but I have to download it on the device I use it, and if I download it on my PC, I have to redownload it on my laptop as well if I want to play it on my laptop or yeah, wherever.

Natalie Reyher:

OK, but you could like for example not play on your like phone, right?

Frequent Gamer:

No, I don't think so, no. I'm not sure if this is even supported. I mean there are various variations of games. For example, League of Legends has an extra mobile game which is called Wild Rift, but it's like the real game I'd say, but not entirely. It differs a little from the original game because you have, yeah, other abilities. And I mean obviously on a smartphone you can't really have the same controls as on your PC, but yeah, they took care of it by just inventing a new game just for mobile.

Natalie Reyher:

OK, I see. And umm, I don't know if you have ever, like, I mean, I guess you probably heard already about cloud gaming. Like, I think you said that you never tried it, so could you like, tell me why not? And maybe also concerning your friends, like what is your opinion about cloud gaming and what's the reason that you did not try it yet?

Frequent Gamer:

Hmm. Umm. So, I've heard of it before, and I already talked about this with my friends. And we discussed a little bit about, um, if it's worth it or not, because we all use very high-quality PCs I'd say. So, for us we don't really need to use cloud services as a provider because we all use good graphic cards. And also, my friends are gamers since I don't know, a long time ago, so they took care of it by just buying better PC equipment. And I think for example, yeah, the thing is if we have bad Internet connection and, yeah, your ping gets high, you can't really play online games that well and even if the Internet at home is a little slower it's probably still better than just from a cloud provider. And yeah, this is a very important thing if you want to play games where you need lots of reactions and yeah, for I mean just in general, the ping is very important.

Natalie Reyher:

OK, I see. I also watched some YouTube videos concerning gamers talking about cloud gaming, and, uh, we also conducted some other interviews and some of them said that, as you also said, it depends very much on the kind of game you play. Like if you have a not so fast game, it could be like better to do cloud gaming because you have less latency issues. So, would you say that there is any kind of game where you in theory still would say, OK this one I could also play with cloud gaming, or would you say for all of them the experience would be worse than with downloading it?

Frequent Gamer:

So, I exclude online games from this, but if you have a single player game like Wolfenstein for example, as I mentioned before, I also played this, I can imagine also playing this on my laptop for example, because on my PC I wouldn't use cloud streaming because I mean yeah, like I said, I have the equipment that I need. Not the best one but suits me. But if I use my laptop and I am, I don't know at home for example, and or visit someone and I just want to play a game, I would consider using this because my laptop doesn't really have the stats that my PC has.

Natalie Reyher:

I see. Do you already know somebody that actually plays cloud games? So, you said in your inner circle people usually don't. Have you heard about someone that actually said, yeah, like, I'm fully into it, can also be, I don't know, like just sporadic gamers or whatever.

Frequent Gamer:

No, actually, I've heard that a lot of people, especially Youtubers, are trying this out, but not in my circle. Yeah, from my circle, I'd say I've haven't heard that someone is trying this, but yeah, I wouldn't exclude it that they won't try it ever, but until now they haven't.

Natalie Reyher:

OK. And um, like let's say that a new game is coming out and you could only play it via cloud streaming service because it would not be available on other platforms to download it. Would you be willing to do cloud gaming if, like, there's a game you really want to play but it's only on cloud gaming or would you say, oh, I'm not sure like cloud gaming could be a reason for me like not to buy it even if I want to play the game.

Frequent Gamer:

Um, it depends. As far as I know, the games on cloud server, you have to, you have to pay for it. Because yeah, the provider needs the money and so I'm not sure if I would say I won't do it, because like I said before, I also bought some games from, for example, from Steam. I would say if I really wanted to play the game, I also would use cloud streaming. But it wouldn't be my first choice now because I think there are some issues that need to be improved before that.

Natalie Reyher:

OK. If you would imagine that, like your Internet connection would be great and that you would not have any latency issues, um, would you then say that cloud gaming would make more sense? Or like I think your number one reason not to do cloud gaming was that you already got good hardware, so you don't need it. Or like what would be reason #1, um, besides, that holds you back from doing cloud gaming?

Frequent Gamer:

Yes, because I spend that much money on hardware. I want to use it. So, this would be a really top reason. I'd say that I really want to use my hardware because I bought it and maybe that I don't know if cloud services are that reliable. So, I'd rather trust in my hardware now rather than the cloud provider hardware. So now this is also a little trust issue I'd say, so that I rather trust in my hardware I have at home.

Natalie Reyher:

Yeah, yeah, I totally understand. I mean, um, Cloud gaming is still in the like early shoes, so, um, I guess probably you would be more willing to try it out once like it has been adopted like better and has advanced, right? So, you would be more the type of gamer that wants to wait until it has improved. At least that's what all articles say about regular gamers that they, like, still wait if it gets better and at this current state are just not interested.

Frequent Gamer:

Yeah, I mean I think there are a lot of people that try it right now so they can test it and say what kind of issues still occur. But I think once it is established, like every other platform, I think most of the players can, you know change to cloud gaming because it is a convenient thing to do, because I don't know if everyone is willing to pay that much for good hardware, and if you have like a regular payment for a game and you can just quit it if you want to, I think it's quite convenient.

Natalie Reyher:

Just to like uh, have a suggestion from your side like what would have to change, like to make specifically for you, like cloud gaming, more interesting. I mean we know that you already have the hardware so that obviously cannot be changed, but would there be anything where you say like, OK, if cloud gaming would have this or this feature or this and this less inconvenient, I would still be willing to play it even though I have my own hardware.

Frequent Gamer:

I think the main issue right now is that you can't really play on the Internet level you have right now. So, if they would fix the ping issue, I'd say if it doesn't take that long or at least I mean I'm not sure how the difference is between using clouds or using native networks, I'm not sure what exactly the difference is there, but I'd say for online gaming this is essential, so this has to be fixed. I know that they are working on it, but yeah, they are still not where they should be.

Natalie Reyher:

OK. I see. And just in general in terms of gaming, what would you say, like, is the future of gaming? Cloud gaming, console, PC or like did you also notice a trend like where it's going, what becomes like more important or less important?

Frequent Gamer:

Um, since I've done an internship. in the AR department, I'd say that yeah, not only the gaming industry but especially the gaming industry is becoming more and more, you know, I'd say AR heavy because the more reality the player has, the better the game experience is. So, I'd say there's a quite good trend for VR and AR headsets for example. Like the Apple headset that is coming in, I don't know, genuine January 2023, yeah. But yeah, I see there is a trend going there, especially if you have online games. And yeah, so I think the more realistic the game is, the more people will play it and if they can handle the hardware issues that you don't have to wear the heavy hardware on your head, I think this is the main development in the gaming industry right now.

Natalie Reyher:

Thank you, I think for now that's all the question I have. I don't know, do you have anything to add concerning gaming or cloud gaming or like concerning your opinion on all of that as a gamer?

Frequent Gamer:

Um, I'd say that I believe that cloud gaming is on a good way to become a very popular and consistent platform, but it is, it has a far way to go. But I'm sure that you know good people are working on it, and so I'd say that this could also be a future thing besides VR and AR gaming, so it's a reasonable thing to do if you don't want to pay that much money.

Natalie Reyher:

I think then we have it for today, thank you very much.

Appendix 106

Interview partner: Founder and CEO of Business in Games, Male

Company Description: Business in Games (BIG) is a Gaming Strategy and Marketing firm.

Written answers

Question:

How is the future of gaming to be expected? Will the future be cloud gaming or what kind of gaming?

CEO of BIG:

Computers are becoming cheaper and cheaper, I think cloud gaming could have been huge 15+ years ago if the internet could have sustained it, but with simple Android phones now able to play immersive games, I just don't see it being a mainstay.

Question:

What were/are the challenges in the introduction of new ways of gaming like for example cloud gaming?
How can these challenges be overcome?

What are currently the biggest problems in the gaming industry?

Are there any measures undertaken to deal with the problem of Internet speed & connection issues which are possibly one of the most important issues for advancements in the gaming industry.

CEO of BIG:

I think it needs to be pitched at lower socio-economic areas. In much of the Western world, people can afford computers to play great games. In Asia they're often able to go to a cheap internet cafe to play. The biggest problems come around how people can make money other than being the publisher themselves. There must be room for significant revenue and profit outside of making the games. Internet measures depend wholly on the location/country. Some places like Korea or Sweden have historically invested heavily in internet. Sweden dominated the early FPS esports title CS 1.6, the pros I have talked to attribute it to great internet infrastructure early in Sweden versus other countries

Question:

Which geographical markets/customer segment seem most promising?

CEO of BIG:

India's new mobile & gaming device adoption is huge, that will be a target for many. However, finding the right partners in that region is very hard

Appendix 107

Interview partner: Senior Software Engineer Xbox Cloud Gaming, Male

Company Description: Xbox Cloud is Microsoft's own cloud gaming service.

Written answers

Senior Software Engineer Xbox Cloud Gaming:

Like I mentioned before, I don't work on the business side of things, but I'll try my best to answer your questions from the limited context I have:

Question:

How is the future of cloud gaming to be expected?

Senior Software Engineer Xbox Cloud Gaming:

Just like Netflix (and others) came to replace the traditional DVD rental industry; cloud gaming is here to replace traditional console-based gaming. As more people embrace the idea of playing any game, on any device, any time they want, cloud gaming will become the #1 way to play high quality AAA games that were only possible before on consoles.

You can expect that just like today you can buy a cheap Roku Streaming Stick, plug it to your TV and get instant access to dozens of video streaming options, there will be a day when you'll buy some sort of small, cheap device that you'll plug to your TV, and you'll get instant access to hundreds of cloud-based games. Your TV might eventually come with a built-in capability to stream cloud games.

Question:

Will the future be cloud gaming (only)?

Senior Software Engineer Xbox Cloud Gaming:

Hard to tell, but cloud gaming will be at least as common as video streaming is today.

Question:

Can cloud gaming replace the other gaming options or will it remain complementary?

Senior Software Engineer Xbox Cloud Gaming:

I think native mobile games are still a huge piece of the market, and will still be for a long while, but anything you buy a console for today will likely be replaced by cloud gaming.

The exception will likely be markets where people can't afford either a good Internet connection or paying for a subscription service. For them, the continued use of consoles and disks will likely be the preferred way of gaming.

Question:

What were/are the challenges in the introduction of cloud gaming? How can these challenges be overcome?

Senior Software Engineer Xbox Cloud Gaming:

- There's a lot of infrastructure needed to enable cloud gaming. Only the biggest market players (like Microsoft) can afford both setting up that infrastructure and the top-level engineers that can build services to enable the whole cloud gaming experience.
- Networks vary in each world region. The experience can be spectacular in the US, but super poor say, in Latin American countries. Therefore, good partnerships between cloud gaming companies and Internet/mobile carriers need to be established. That guarantees the required networking reliability and speed are in place for the best experience.
- Most AAA games were not built for a cloud gaming environment. Somehow, they need to be adapted to be able to run in a cloud data center and still render in the user's device as if it was a local game
- People are not playing games all day, yet cloud gaming servers are running day and night in data centers, which costs money. How to ensure those servers are not idle there just doing nothing? An interesting challenge.

Question:

What are currently the biggest problems?

Senior Software Engineer Xbox Cloud Gaming:

Currently the global inflation/recession is also impacting cloud gaming, specifically preventing companies from hiring more talent that will allow expanding the capabilities of the gaming cloud. Without new engineers coming in, it's hard to start new initiatives.

Question:

Are there any measures undertaken to deal with the problem of Internet speed & connection issues which are possibly one of the most important issues of cloud gaming?

Senior Software Engineer Xbox Cloud Gaming:

I can't give many details here, but yes, finding ways to get the gaming server as close as possible to the actual gamer is one of the areas cloud gaming companies are currently investing in to ensure the best possible connection from client to server. Also, like I mentioned before, partnerships need to be established with mobile carriers to ensure their networks are ready for the needs of the cloud gaming model.

Question:

Has Xbox changed anything in its business model since adoption? If so, what and why?

Senior Software Engineer Xbox Cloud Gaming:

I don't know much about this, but I do know that in the past it was all about getting game consoles in people's homes so that they could start buying games to play on them. Today, it is all about getting people to subscribe to our Game Pass service (which includes cloud gaming) so that they become monthly paying customers, even if they never actually buy a console. And, if they buy it, it doesn't matter if we lose money on the console itself, as long as it becomes the player's gateway to becoming a loyal Game Pass subscriber. Same model as Netflix or any other service you subscribe to it's all about getting as many monthly paying customers as possible.

Question:

Which geographical markets/customer segment seems most promising?

Senior Software Engineer Xbox Cloud Gaming:

Sorry, I don't know much about this.

Appendix 7

Interview 7

Interview partner: Chief marketing officer at AirConsole, Female

Company Description: AirConsole is a global cloud gaming service.

Written answers

Question:

How is the future of cloud gaming to be expected?

Chief marketing officer:

Cloud Gaming Market was valued at USD 609.67 Million in 2021 and is projected to reach around USD 7382.37 Million by 2028, at a CAGR of 42.8% during the forecast period. (source <https://www.linkedin.com/pulse/cloud-gaming-market-2021-size-business-statistics-trends-thakur/>). Hence what I expect is the cloud gaming market to grow - but not as much as mobile gaming. Indeed cloud gaming does require top knot devices that a lot of people can't afford (= in emerging markets).

Question:

Will the future be cloud gaming (only)?

Chief marketing officer:

I personally highly doubt so because of the high cost of cloud

Question:

Can cloud gaming replace the other gaming options or will it remain complementary?

Chief marketing officer:

Will be more complementary.

People might like to play on their mobile phones through apps while commuting but might like to connect to cloud gaming at home. It really depends on the type of games you play. Casual games don't require cloud gaming

Question:

What were/are the challenges in the introduction of cloud gaming? How can these challenges be overcome?

Chief marketing officer:

The increasing user of gaming devices is the key factor which drives the growth of cloud gaming market. As mentioned above cloud gaming does require top knot devices (= expensive) and very fast internet. To make cloud gaming accessible worldwide we would need to make devices more affordable and the internet faster in places where it is too slow.

Question:

What are currently the biggest problems?

Chief marketing officer:

Same as above. It is too highly linked to internet speed and devices. You can't play cloud gaming with an old android or even iOS phone..which is still the most used device to play, worldwide.

Question:

Are there any measures undertaken to deal with the problem of Internet speed & connection issues which are possibly one of the most important issues of cloud gaming?

Chief marketing officer:

Yes. Cloud gaming companies are doing more and more games that require less power (= less internet speed and ram). they are also building partnerships with local telco providers so that cloud gaming becomes affordable & included in Internet packages)

Question:

Has AirConsole changed anything in your business model since adoption? If so, what and why?

Chief marketing officer:

AirConsole was 100% free for a few years but then we needed to become profitable and started introducing subscriptions (= free trial for 10 games but then monthly subscription to have access to more than 100 games). Retention dropped but revenue obviously grew. Having said that, the subscription renewal rate was low so we then also introduced the yearly subscription. We haven't tested yet pay per game or other business models other than subscriptions.

Question:

How could the Cloud Gaming business model in general be changed to strengthen opportunities/mitigate weaknesses? (for our thesis we need to suggest changes/adaptations to the cloud gaming business model in order to improve strengths/weaken weaknesses).

Chief marketing officer:

I am a strong believer in dynamic pricing. Meaning prices should be customized to users needs. Some users might prefer yearly subscriptions, others might prefer to pay for only one game forever. Dynamic pricing with good UX (meaning not showing too many options at once) would be a great way to increase revenue. For instance if you see that user X only plays one game (which is by the way very often the case), then you should propose him to pay for that game forever (like a console game) and then propose him similar games or some add ons for that game (for instance new level access, new characters etc).

Question:

Which geographical markets/customer segment seems most promising?

Chief marketing officer:

Initially AirConsole wanted to make gaming accessible to ALL - even those who couldn't afford a console. The reverse of the coin is that those who can't afford a console usually have very bad internet connection and pretty old devices. At the moment the most successful (= profitable) markets are the usual ones : North America, Northern Europe. The most promising ones are the ones with fast internet speed while not having access to consoles - South America is a good example. In South America consoles are x5 times more expensive than the US but the internet is good, and they can afford good devices.

Appendix 8

Interview 8

Interview partner: Senior Hardware Engineer at Sony PlayStation with focus on designing next generation PlayStation 5 based cloud gaming infrastructure, male

Company Description: Sony Playstation has its own cloud gaming service integrated into the PlayStation+ Premium subscription.

Written answers

Question:

How is the future of cloud gaming to be expected?

Senior Hardware Engineer at Sony PlayStation:

Future of cloud gaming is very bright as it is evolving at a fast rate to reduce latency and improve performance. With more improvement in coming years there will be a day where a user won't realize the difference between playing on a local console or streaming via cloud server

Question:

Will the future be cloud gaming (only)?

Senior Hardware Engineer at Sony PlayStation:

No, there will always be local console gaming for the hardcore gamers that like to play strategy-based games to get full performance and no interruption. But cloud gaming will be adapted more and more in the upcoming future

Question:

Can cloud gaming replace the other gaming options or will it remain complementary?

Senior Hardware Engineer at Sony PlayStation:

It will be complementary to local console gaming

Question:

What were/are the challenges in the introduction of cloud gaming? How can these challenges be overcome?

Senior Hardware Engineer at Sony PlayStation:

Main challenge is internet speeds and latency bottleneck while streaming the games from the cloud. This can be improved with better fiber-based internet speeds (>1G) and enhanced PCIe Gen 6 storage SSDs. Better integration of the SMART NICs and PCIe switches to smoothen the PCIe data transfer path will help in improving the performance and reduce latency.

Question:

What are currently the biggest problems?

Senior Hardware Engineer at Sony PlayStation:

Main advantage of cloud gaming is to play the games you love not just locally at your home but also when you are travelling for work or leisure. But currently the integration of mobile devices powered by cellular data is restricted due speed limitations and 5G infrastructure deployments. So, cloud game streaming is still lagging in the handheld mobile devices

Question:

Are there any measures undertaken to deal with the problem of Internet speed & connection issues which are possibly one of the most important issues of cloud gaming?

Senior Hardware Engineer at Sony PlayStation:

Faster Fiber based (1G) internet deployment is increasing to cover more areas with high-speed internet. More Datacenter deployments in major cities to cut down the distance to the user. Faster and enhanced PCIe Gen6 SSDs will improve the latency and performance issue.

Question:

How could the Cloud Gaming Business Model be improved?

Senior Hardware Engineer at Sony PlayStation:

In general cloud gaming business model has room for improvement.
Better designed subscription models for users to select based on the games that they are interested in.
Provide more economical and flexible plans for occasional gaming users.
Adding newer and popular games to the mix for increasing cloud gaming subscription users.
Ability to sync the local game data progress with cloud gaming data when you switch between the two.

Question:

Which geographical markets/customer segment seems most promising?

Senior Hardware Engineer at Sony PlayStation:

Currently PlayStation cloud gaming racks are deployed across the globe with focusing on North America, Europe, and Asia.
Asian market seems to be upcoming and developing at faster rate and shows more growth promise in the future.

Appendix 9

Interview 9

Interview partner:

Core gamer, Male

Natalie Reyher

Hi. Thank you for being here today.

Core Gamer

Thank you very much for having me. Great.

Natalie Reyher

So, first of all it would be nice if you could super short like introduce yourself and tell me in what terms you are related to gaming or IT and also what kind of gamer you are.

Core Gamer

Alright, OK, so first of all, um, I consider myself some sort of an E-sportler because whenever I've been playing a game I've been trying to get to the very top. So, in the previous, I think let's say 13 years, ever since I was ten, I've been playing different kinds of games. The first year I started with was called League of Legends. There was like a strategy MMORPG game which you probably know is more like a strategic game. And then at some point I transitioned towards types of shooter and ego shooter games. Starting with PUBG (Players Unknown Battlegrounds) over to Fortnite and even making some money with it due to the fact that I was at the top of the leaderboards and did weekly cash Cups and won a bunch of let's say like a couple of thousands of dollars. Then I transitioned to the main game, which is called Valorant, which I've been playing for like, let's say, around two years, and I'm currently, I think, one of the best 5 to 10,000 players in Europe right now. Yeah. So, I would consider myself kind of an esports gamer and maybe at some point I'll join an organization to make money with that. We'll see.

Natalie Reyher

OK. That's very impressive. Um, so can you just explain me like getting paid means that if you're on the very top, you're automatically being paid because some companies approach you or like how do you reach the level of becoming a pro gamer?

Core Gamer

To be a pro gamer, it's very different in some games. In games like Valorant for example, you have to be part of a team like an organization which like gives you wages every month, which pays you for just being part of the team with for example marketing deals etcetera. And then there's games like Fortnite where the creators of Fortnite, which are called Epic games, they do like weekly cash cups where everybody in the entire world can join the cup and if you place under the top 100 for example in like 3 hours of playing or top ten, you get like a bunch of money which is sent out from the company itself, and this way they try to support you in playing competitively and trying to support their competitive scene in the game so it stays interesting for people. And if you are good at the game, you can qualify for these tournaments, and if you're good in the tournaments, you get money.

Natalie Reyher

OK, that's very interesting. Could you tell me like in order to reach this pro level, how many hours like per day or per week did you play?

Core Gamer

Of course, it always varies with how much time you have. Obviously, I'm studying so some time I play more and sometimes I play less. But when I have my goal in mind and want to be at the very top at like a certain tournament, I often try to make time and then play, let's say around four to five hours each day. And at times where you don't have any time, I sometimes don't play at all for like 2 weeks. Or I play at least let's say two to three hours a week. But I'd say on average in the past couple years I've always played at least like 2 hours per day.

Natalie Reyher

OK, that's very impressive because I also had another interview with like a regular gamer, but she also said she played like 2 hours per day but she never like reached like the pro level like you did.

Core Gamer

Yeah. I think it kind of depends on how serious you play the game. I usually play to win. For me gaming is fun, of course, but it's also like where I kind of shut down my brain and say 'all right now I'm focused on winning'. It's like some people play soccer and after that they're like, yeah, that was so fun. I was so hyped and pumped. That's what I feel in that game, because I really just try to be the best at whatever I play, because if not, I feel like I'm wasting my time, which is not really true obviously as it is also for entertainment reasons, and I'm also playing with a lot of friends, but even with them we always, I would say, play competitively. I usually don't play casually.

Natalie Reyher

Ah, OK, so you're like a very efficient gamer in that sense.

Core Gamer

Maybe, yeah.

Natalie Reyher

OK. And I think you already said like what kinds of games you played. Can you name them again like you said, Fortnite and what was the name of the other one?

Core Gamer

I started with League of Legends, I think that's a very famous game and then I continued with Fortnite and now I only play Valorant which is a new game, like two years old, which is kind of like Counter Strike. It's the same system with the protectors and attackers, I guess that's how we call them: defenders and attackers.

Natalie Reyher

OK and this brings me to our next question like how do you play, which devices do you use, which platforms, how do you access the games?

Core Gamer

I'm playing on a custom self-made computer on a PC, which I built I think two to three years ago actually, from the money I earned from these tournaments in Fortnite, I built myself a new PC. It's made-up of very, very expensive and good parts, so I have the best possible hardware to game. So, I'm playing on mouse and keyboard as well. I think that's important. I'm not sure about subscriptions. I don't think I have those. And there's mainly like gaming platforms from the games itself where you play on. So, it's a program, sometimes it's Steam. But I think Riot has like their own game platform where you're playing on.

Natalie Reyher

OK, so this means that you have digital distribution only platforms either like from companies like Steam or from the publishers directly and then you download the game to your gaming hardware?

Core Gamer

Yes, that was well said. That's exactly what I meant.

Natalie Reyher

OK, great and can you tell me how long such a download takes? Because the regular gamer that I interviewed said that sometimes this can take up to 6 hours depending on the Internet connection.

Core Gamer

I think she's not even wrong with that. I remember there's some providers which have very, very bad ways of **downloading** their game. It really often takes a lot of time. I can't remember downloading any game below like an hour or so. And my Internet is very, very good. It always has been very good on the different places I've lived. So, I don't think that was the issue. I think the download rate is just super bad on these providers sometimes.

Natalie Reyher

OK, so that definitely is somewhat a pain that you first need to download it, right? Or at least the time to download it?

Core Gamer

Yeah, definitely. When you want to play a game, that often takes a lot of time to download the game first, and at the same time you can't play other games. I know that sounds kind of like addicted, but if you have to download a game, that means you can't play another game at the same time. Your Internet is just not working on that level. Like even if you have like downloaded another game already, you cannot play it meanwhile you download another one. If the game you have on your PC which you want to play on your PC right now works over the Internet and it's not like an offline game, then it's almost unplayable. At least for me it just takes too much Internet, and you feel like a little latency, whenever you play, which maybe some casual gamers don't notice but for me, I feel it very very much.

Natalie Reyher

OK, that's very interesting. And would you also say like if your roommates also play a lot, and you all have the same Wi-Fi that this also reduces speed and quality?

Core Gamer

Interesting. Yeah, I'd actually say that's true. I remember a time where even though we had a very, very good Internet, whenever my three roommates and I, when we were playing together, for example, we played a PS3 game, we'd sometimes run into issues where the ping was very, very bad. And the game was just not feeling very good.

Natalie Reyher

OK, I see. Yeah, that are interesting insights. And coming to the topic of cloud gaming, like what is your opinion about it? Like did you ever try it? Do you know people who tried it? Like what would you say about using cloud gaming to do what you do now with gaming?

Core Gamer

About Cloud Gaming itself, I only know a little bit, but I personally haven't tried it myself. But I know this much: I know that I think a friend of mine used it before, as we played games which were not very heavy, which don't need very good processor and graphic cards. So, I think it was like a casual game, but I don't

know anyone else of my friends at least who tried playing for example. Games I play, like Valorant or Fortnite or whatever, like if you play the at my Level there is a very big difference between having like a bad PC and playing it with like low frames. I don't know if you know what frames are, but in a gaming sense it means that you have for example 60 pictures per second and playing a game like Valorant on 60 pictures per frames per second is not enough, you have to play it on something like 144 or 240 and that is usually the least, and how far I've done my research at some point, this is not possible yet with these cloud gaming solutions. So, in order to play competitively on my level and on these let's say rather processor heavy games, you have to have your own expensive hardware to actually run them on a good level where you can compete. It's milliseconds that make the difference for gamers like me.

Natalie Reyher

OK, I totally get it. Cloud gaming does not work equally well for all kinds of games and multiplayer games which are very fast are at least for now not very suitable. Maybe sometime in the future. But could you imagine a way cloud gaming could also attract pro gamers like you? Like what they could possibly offer you that you would also use their service maybe if not for these type of games like other premises or also imagine there would be a new game that you could only play via the cloud. Would it be like a no-go for you, or would you still go for it if you want to try the game?

Core Gamer

No, it would definitely not be a no-go. I think I would actually go for it in the future because even my PC will probably at some point be outdated. So probably there will be a point where you can play games with Cloud Gaming, which I can't play with my very old hardware, and I have to invest loads of money to get like a new PC to play the current games. So, I think at some point I will also switch over to playing casually and then I will of course have the opportunity with cloud gaming to still play great games even though my PC isn't suitable for the new games anymore. And I think this will be the point where I'm probably going to start playing with it. And yeah, also maybe thinking about like let's say like storage space, on my PC I only have space for let's say four to five games. So, at some point I don't mind just using cloud gaming if I don't have to download another five casual games, which I just play with my friends sometimes. So even for that I would consider cloud gaming.

Natalie Reyher

That is very interesting. So, you say that like if you would like to add like a sixth game now like you would have to delete another one or like how would it work?

Core Gamer

Yes, so in that sense, I will definitely consider playing cloud gaming if that means I don't have to delete another game for it, because that is my state right now. If I want to play another game right now, I definitely have to delete some other game.

Natalie Reyher

OK. Is this also the reason why you don't play many different kinds of games? So, because of the download and that you then would have to delete other ones, does this somehow play a role in how many games you play?

Core Gamer

Actually, I think yeah, I think that's somewhat true. I just remembered we always played Fortnite together. Um, like let's say five months ago I still played a lot of Fortnite sometimes. Then I switched to another game and that game has like very big storage space. So, I had to offload Fortnite and ever since then I stopped playing Fortnite. But I remember multiple occasions where some of my friends were saying, hey, let's just play a round of Fortnite just for fun and I said no, sorry I can't because I had deleted it, so we didn't do it.

So yeah, I think that would have been a time where I would have thought, alright, if I can just easily play it on cloud gaming right now, I would do it.

Natalie Reyher

OK, these are interesting insights. And could you also tell me like how much did your hardware cost?

Core Gamer

Good question. I think when I bought it freshly new, there was like 4 to 5 parts which already had, but if I consider them as well, I'd say it approximately 2700 € or something. Yeah, it was very expensive.

Natalie Reyher

OK. So, you would say that it's also like the higher range of money that people pay or what is the minimum like you have to invest to get hardware you can properly play with.

Core Gamer

I think right now I just built a PC for a friend, so I know that for a fact I think it's around, now let's say, 900€ right now. The hardware should have like a setup which is good for every game, and you can somewhat play on a competitive level I'd say you have to pay at least €900 and you'd still not be even close to what you can have right now.

Natalie Reyher

OK. And you said like you have a real PC to game on or is it like a laptop?

Core Gamer

It's a real PC, yeah, it's a tower PC and a big screen which has these 240 Hertz that I was talking about. So, it's very expensive.

Natalie Reyher

So, what do you do when you like go on holiday somewhere else? Do you then don't play at all, or do you use something else to somehow play?

Core Gamer

Um, no good questions, I think I don't play at all. Yeah, that's a very good question. I think, I know where you're going with that. But yeah, I don't play at all. And it's, I don't know, it's kind of annoying. I do other stuff of course, it's a lot of fun, but yeah, sometimes you think even on holidays, why do I not play a game right now? But you can't because your PC is very, very limited to one location and you can't just move it around.

Natalie Reyher

OK. Would it like, would you still be OK with like for example then having cloud gaming to just, I don't know, use your laptop or your iPad to game or would it be like too low of a level for you because you maybe cannot play as well?

Core Gamer

Honestly no, I think I would do that if it would be possible. I mean I have a laptop as well. It would be possible to play let's say on a mediocre level the game on like for example holidays. If I want to keep my competitive level of gaming even on holidays, I would definitely consider playing cloud gaming even though the output isn't as strong from cloud gaming as it would be from my home hardware. I think I would still play on that, just to keep the level and keep my brain in the game. Because, you lose your skill quite fast. If

you stop playing a certain game, you have to really keep training and training and training to stay at the top level.

Natalie Reyher

So you say that like for example if you have a longer break, you like lose your skills kind of.

Core Gamer

Yeah, I always say it's kind of like riding a bike, so you don't lose it completely. You're always at a very good level, but you'll lose like muscle memory, I would say. So, at some point after, let's say if you don't play it a couple of weeks, let's say two or three, you come back, and it just doesn't feel natural to you anymore to do certain motions with your hands coordinated with your eye. Because obviously gaming is a lot of hand eye coordination and reflexes, and your reflexes aren't as trained anymore and you kind of lose those automatic functions in your brain. You really have to think about every single thing you do, and that makes you slow and obviously not as good at the game anymore. So yeah, it's I think if you don't play consistently, you don't have to play 10 hours a day of course to keep your level, but you should play a bit consistent, and not playing for a while really drags out your skill.

Natalie Reyher

Does it also help to play on a different device like laptop even though the setup is different from your regular gaming PC?

Core Gamer

If you switch your setup, it's kind of weird. You need to adjust to it a little bit. But I think, adjusting to new setup doesn't take too long. It only takes like for me at least, like an hour or or maybe an hour and a half or two and then you're most likely going to be fine again. So, I don't think that's a big issue.

Natalie Reyher

OK, that's interesting because just imagining that like, I don't know, a pro gamer goes abroad and maybe cannot take his like big PC with him and then he would like to keep gaming with his laptop, I mean I know that for like the type of game that you are, this is like not the most adequate but still. And did you ever try also for example Fortnite on mobile or did you really like only always stick to your PC?

Core Gamer

I wanna answer one more thing to the question before I think for me, what I do personally to like, keep ahead in the game is I sometimes watch streams or something about the game I play to keep my brain a little bit more in the game. So that works. If you watch pro players on the Internet do that, that kind of works. But to the new question: No, I don't think I've tried it. I think once when I was on vacation, actually I downloaded Fortnite Mobile on my iPad. But it's too different of a game between having your mouse and your keyboard and various possibilities where you use your fingers instead, like touching your screen and having like a different mechanic to walk and build and everything at the same time. I think for me that was just too much, too different, so that for me that was not really a thing and also, I really did not enjoy it, at least so far. Playing a game I know, and then playing the mobile version of it, because for me it's always like that's not like the game I ordered on wish or something, you know? It just doesn't feel the same quality.

Natalie Reyher

OK, I see. And like just in general, what would you think about hybrid games? So, if for example, generally the game is streamed, but like parts that require like more loading capacity or are very fast are then processed by your own hardware so that it's like a combination of both would you see sense in that?

Core Gamer

That's the first time I've heard of it, but I think it sounds very, very good. I'm just imagining that point which I already said where I say my PC is good, but it's not amazing anymore and it can't be like at the top of the level, then having this hybrid version sounds like it could at least somehow boost my performance in like having some of the processing done at a certain server and then transfer back to me. I think that's a very good thing. I think with that you could tweak it and it would support like having a decent hardware and then maybe having it tweaked by a distant server which is working for you. I think that sounds pretty good in my opinion.

Natalie Reyher

OK. And would you also think like that this could make the lifetime of your hardware longer because like it's less used if you play like these hybrid games or do you see that with time and playing more that your hardware gets kinda not damaged but, you know what I mean, old.

Core Gamer

Yeah, definitely, yeah of course. I think it supports my hardware in the sense that it eases the pain for the hardware by supporting it. So yeah, I think that makes sense. Definitely.

Natalie Reyher

In terms of the future of gaming, I'm sure that somehow you must have an opinion. So, what do you think? Like where is it heading? Do you see a very special trend or also for the pro gamers maybe?

Core Gamer

Definitely. I think maybe what I should add is I also played games like for example UM Assassin's Creed or some single player games in my time. Kind of forgot about saying that, which are like games, which I play just to enjoy myself, but I didn't do it that much, so I didn't want to make that a thing. But I think those games could also be played on cloud, just to say that again. But about the future of gaming, the gaming industry itself, in my opinion it's a growing business Looking at, for example, the developments due to Corona where people had to stay at home, had to find new ways of entertaining themselves. Um, I think the future of the game industry looks great. For example, people often say, hey, I don't feel that good like in their day-to-day life. I don't feel like I have this thing which keeps my focus off things and just entertains me or, um, gets me through the day. Whenever I was mad or sad or whatever I could just play a game and after that I was totally fine. So, I don't know, it's like a crazy thing to me and I think people just now discovered that and realized alright, gaming was pretty good. It's like a very nice way of interacting with your friends. I mean I personally almost only play with friends on that high level because on single player on that level you have very bad teammates, and it gets very toxic sometimes. So, you better play with nice people. So, that's what I personally do and I think even more players or people are becoming players and playing games in the future because it's just such a nice way of relaxing and or playing competitively and challenging yourself and I think it also will change a little bit in its shape. I think it will stop being the classic mouse and keyboard controller gaming at least at some point and all transfer over or spill over to virtual reality and augmented reality gaming. I think that's really where it will hit even more niche of people, uh, and I'm really looking forward to it. For example, I don't know, I could imagine playing a game like Valorant on a competitive level in virtual reality because I'm a very physical guy, even though as I said, game a lot. So, I would love to have this gaming aspect spilled over towards VR and AR. We'll see at some point how it's going to be. But yeah, I'm looking forward to that.

Natalie Reyher

OK. But have you ever tried, like virtual or augmented reality games?

Core Gamer

I did an internship at Vodafone and there they had a lot of artificial intelligence. It was augmented reality and examples of virtual reality and that combined. So, I did it there a lot whenever we had free time, I'd say.

And it was really, really fun. I think it's it's a really good way of experience something else, while not only sitting at home but also being very active. It was very fun.

Natalie Reyher

OK. Then maybe just one final question. You already said that even now there would be like some situations where cloud gaming could potentially also suit your wishes. Like what was holding you back or what would like cloud gaming to have to do that you'd like to come into action and say I try it out now, like what was holding you back?

Core Gamer

Um, I think the main thing that was holding me back was, uh, the types of games I played, as I already said because those were very processor heavy competitive games. But as I just remember I should have said at the beginning I also played numerous games which I'd say are more single player and don't have this limit of processing power, which is for example, at least I think, they could be played on cloud gaming on 60 frames and are not competitive. Let's say for example Dark Souls, I played it, and that makes a lot of sense to play on cloud gaming. Assassin's Creed for example makes also a lot of sense. And even all these funny games like promo Party or Mario cars and all that makes a lot of sense. Like I think you already said it yourself, casual gaming is probably where cloud gaming should be headed right now and if they make it possible that they can compete with current technology on a on a higher level it will definitely become very interesting to me as well. And one more thing about the last sentence I said, it would definitely become interesting to me at the time where I have to keep buying new PCs and cloud gaming can match that and say alright, we have like a monthly subscription so you don't have to buy and build yourself a new PC every two years, you can just use our interface. We supply the processing power at our place and all I have to do in the end is log myself into the game to have fun. That's where I'd definitely be interested in cloud gaming.

Natalie Reyher

How long is like the lifetime of this hardware? So, every two or three years you would have to buy something new?

Core Gamer

Yeah, I'd say currently if you want to stay at the top level, you have to buy a basically new PC. Let's say that every two to three years, or at least some new parts. And that is very, very expensive.

Natalie Reyher

And it also becomes increasingly expensive or like cheaper with time?

Core Gamer

Ohh I'd definitely say I think there's of course inflation, but also just in general, like the companies which make the best parts just became more and more expensive. It's like let's say 30 to 40% more. So, it cannot only be blamed on inflation.

Natalie Reyher

OK, very interesting. Thank you.

Appendix



Graphic 1. B2C Cloud Gaming Landscape. (Table by author, Adapted from Rittik, "Cloud Gaming: rethinking the Value Chain")

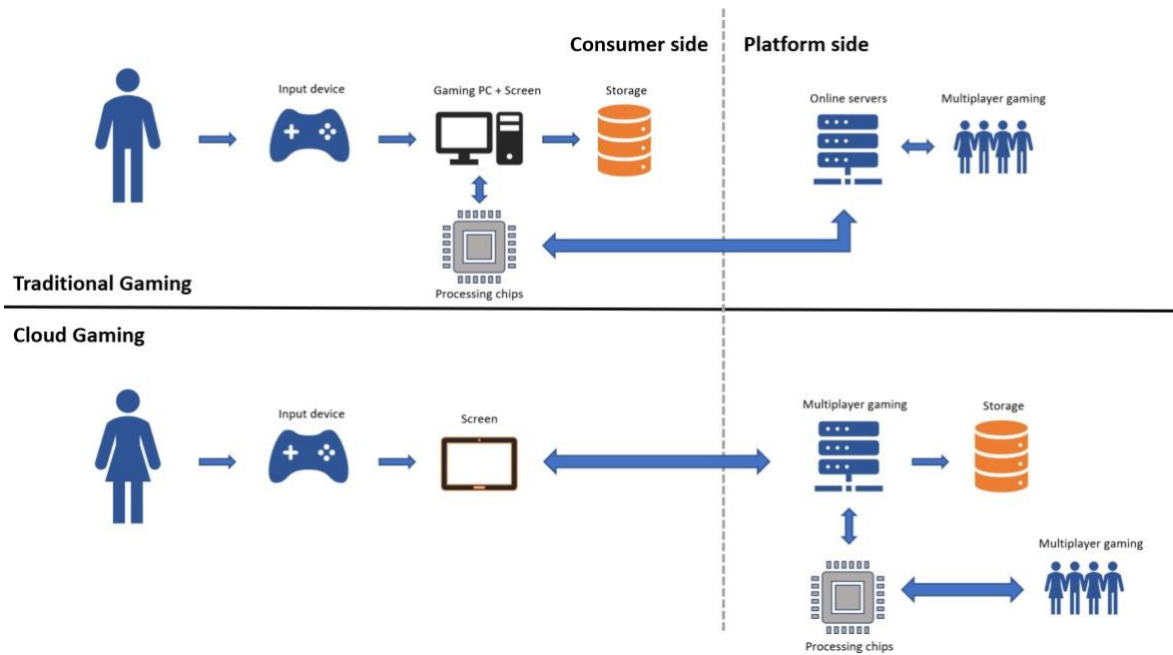
Appendix

Overview of existing B2C cloud gaming companies

Name	Description	BYOG	Incumbent	#Users
Abya	South American hosting service that can switch between mobile, TV, PC. Partnership with NVIDIA	Yes	No	N/A
Amazon Luna	\$6/mo for CDGG and 4 K in future. Amazon controller to play games; Amazon-like buying experience	No	No	Beta testing
Blacknut	CDGG (500+ games) for \$16/mo. Just need 4G / 6Mbps speeds to access	No	No	+800% ('19 -'20)
Boosteroid	CDDG for €15/mo with European focus (servers in Europe). Microsoft recently pulled games from site	No	No	1mn
EA (beta)	EA has been beta testing cloud gaming to see if it works with their games and if it makes economic sense for them	No	Yes	Beta testing
GeForce Now	Game processing (CPU/GPU/etc.) and streaming from NVIDIA servers to multiple devices for \$10/mo	Yes	Yes	10mn
Google Stadia	CDGG for \$10/mo where users use servers and Google controller to stream games (buy from Google or subscribe)	No	No	1mn+
Loudplay	Rent time for \$0.50/hour on Loudplay servers to run already-owned games with a required speed of > 10Mbps	Yes	No	200k
Netboom	CDGG for \$9/mo with 20 games available for subscribers, focused on mobile enablement	No	No	N/A
Paperspace	Part of broader cloud computing company, rent storage and processing power from \$0.45-\$1.10/hr	Yes	No	N/A
Parsec	Cloud work and game-sharing company that also has a free cloud gaming "arcade" with limited games	No	No	N/A
Playkey	Decentralized platform that allows games (both on the platform and owned) to be streamed from servers	No	No	2.5mn
PlayStation Now	CDGG at \$10/mo of PlayStation games on the PS consoles and PC. Needs > 5Mbps connection	No	Yes	3.2mn
Rainway	Free ultra-low latency cloud processing platform (users predictive input rendering) for owned games	Yes	No	300k
Shadow	Cloud processing platform with low latency that gives users dedicated storage and processing space for \$30/mo	Yes	No	100k
The Gaming Project	India-based CDGG offering streaming and processing of their game library and user-owned games	No	No	15k
Vortex	CDGG for \$10-30/mo for access to up to 154 games and monthly hour limits. Required >10Mbps connection speed	No	No	6mn+
Xbox (beta)	CDGG pairs with Xbox Games Pass to offer over 100 games for \$15/mo. Still beta testing	No	Yes	Beta testing

Graphic 2. Overview of existing B2C cloud gaming companies. (Table by author, Adapted from Rittik, "Cloud Gaming: rethinking the Value Chain")

Appendix



Graphic 3. The shift in the process of gaming, adapted from Rao (2021)