

Virtual Reality: Challenges of VR Game Development for Emerging Game Studios

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Abstract. This article is meant to investigate the challenges potentially being faced by an emerging game studio that tends to make VR games in early 2023 where VR technologies hit a plateau which barely having new features coming up, plus the decreasing population of VR players has advocated VR game development to face severe challenges to succeed in the VR field, thus, not being an early bird in the VR game field but tend to join this industry now could be found challenging. This paper explores the challenges faced by emerging game studios in the development, marketing, and economic realms of VR game production. It provides a comprehensive analysis from both macro and micro perspectives, drawing on existing research and scholarly conclusions. By addressing key points highlighted in the article, it advocates for the potential entry of small game studios into the VR gaming domain. Specifically, it delves into challenges concerning hardware, exclusivity, storytelling, marketing, user acceptance, competition, platforms, uncertainties, funding acquisition, short-term sustainability, originality, publishing regions, and engine selection.

Keywords: Virtual Reality, Game Studio, Game Development, VR Marketing, VR Economy.

1. Introduction

Nowadays society, virtual reality has emerged as a frontier of immersive storytelling experiences that traditional gaming platforms won't be able to produce with a display monitor. With the continuing development of virtual reality technology with the development of computer hardware, VR nowadays has a set of opportunities and challenges for incoming emerging game studios that propose to get in touch with their new realm. The cognition of creating worlds where players can jump out from reality with the game is interpreted by the complexities of VR game mechanics to create visual and audio virtual senses to create innovative and engaging players' experiences in virtual reality. Furthermore, marketing VR games and diving into the economic field of VR game studios has created a variety of challenges that are barely encountered by a normal game developer team.

This essay was meant to illustrate the multifaceted challenges faced by emerging game studios in VR game development, marketing, and economic perspectives, which will cover either macro or micro views respectively as the research and conclusion from the scholars exist, by paying attention to the points mentioned in the article could potentially advocate small game studios to VR game, in detail, addressed to the challenges of hardware, exclusiveness, storytelling, marketing, acceptance, competition, platform, uncertainties, funding acquisition, competition, short-term sustainability, original value, publishing region, engine.

2. Game Development

With the development of both PC hardware and VR Headsets, Virtual Reality is still considered a new form of entertainment media or frontier of game development. VR has offered players a fresh visual immersive experience, however, what question has come up to the game studios deciding to make VR games is the demand for the productivity of a game studio [1].

2.1. Hardware

The upcoming, continuous upgrading of the computer setup and VR technologies, has brought the demand for VR game quality to a brand-new height. This progression, however, has made not all VR players able to afford the most updated VR hardware, either due to the high cost or the limited interest in virtual reality. Nowadays, only a deficient percentage of people have updated their VR headset to a better one. Instead, they stay on their original device until they wave out their interest in VR games. Moreover, VR game studios tend to design a VR game that is aimed at the specific level of VR players. For instance, to fully enjoy the game *Alyx: Half-Life* published by Valve, a HTC Vive or Steam Valve is necessary. Lower-performance VR headsets like the most common VR headset, the Oculus Quest series, won't be able to fully illustrate the original game input (Fig. 1). Even the graphic settings won't come as a solution to the lower performance VR headsets since the limited performance of the headset could produce. In this case, only a minority with the most updated VR headset as well as PC set-up could experience the best of what VR game developers have offered, leaving other VR players with outdated devices with a diminished VR experience [2, 3].



Figure 1. VR headsets [4]

2.2. Comfortability

Virtual reality nowadays is still struggling with immersion due to its limitations due to technology issues and design issues. Compared to augmented reality, also known as AR, AR seems to be more effective in immersion than VR. To explain, VR only replaces players; vision, and some audio to introduce a digital space, but continuously pulls you back from the digital world by somatosensory. The human body is complicated, which indicates the upper limitation of VR to becoming immersive. Not until VR companies have come out with a solution of either hiding real-life senses and giving out senses of the most realistic smell, or haptic feedback, having a full virtual reality experience is still imaginative. Furthermore, having a non-light headset on and trapping eyes into a high-temperature zone which would make eyes dry out faster is undoubtedly uncomfortable and frustratingly made VR players stay in VR for usually no longer than one to two hours [5]. Therefore, based on a non-perfect form of media platform, thinking of what could be done in a limited range could be Challenging.

2.3. Exclusiveness

Regardless of which kind of VR game it is, as long as it belongs to VR, the exclusiveness of it will be considered severely horrible. To explain, there is a amount range of genres that game developers draw their thoughts on, it soon narrowed to a frame, which is a VR game. In experiencing a digital world, movement in VR games is always an unavoidable shortage towards VR games' immersive experience. The game type of VR is limited to only players who have micro-movements that won't cause motion sickness since people tend to feel dizzy in a virtual world caused by visual illusion. Therefore, cutting off the section of action games, and building an immersive VR experience with

the addition of a first person's point of view will be crucial. The challenge then becomes how to innovate within these limitations to deliver engaging and diverse VR content that can continuously draw players back into the virtual world without crossing the delicate line of physical discomfort

2.4. Storytelling

Mechanics start to get different since a game studio enters the VR field. They need unique scene designs compared to normal games. For example, Cutscene is no longer an option for VR game storytelling. Once players get into a VR game, they will require continuous feedback from the game. Having a cut scene that takes over players' control for a while to show a grand scene is exclusive for computer monitors that could shift to a film-viewing attitude anytime, which leads to better and easier storytelling. Back to VR, VR players won't accept any cutscene because of the strong demand for VR games to be immersive. Nonetheless, not only an innovative way of telling the story, but the 360-video design has brought up to the desk a brand-new factor that was barely mentioned all the time. This is a genre offering a seamless, uninterrupted narrative experience that allows players the right to look around (Fig. 2). This type of art form challenges the scene to think more spatially, integrating storytelling with well-designed view guidance that draws players' attention even if the space is wide open. Thus, the evolution from traditional storytelling methods of games flips the page in VR, and develops grand storytelling which potentially leads to the success of a VR game [6,7].



Figure 2. Immersive Experience of VR Games games [7]

3. Marketing

The Challenge right after the development of the VR game is the marketing of the VR games. Although VR games still leave an impression in people's minds, nowadays VR has come to a plateau where new features are no longer continuously coming up but small updates of comfort and performance for VR gaming (Fig.3).



Figure 3. The marketing of the VR games [8]

3.1. Acceptance

No matter what level VR players are, it is a fact they are all looking for an immersive experience submerging into virtual reality. Taking responsibility for both optimization and level of detail is one of the hardest challenges to either inside or outside VR games. Overwatch 1 is a great example of excellent optimization. By giving the seventh level between realistic style and cartoon style, overwatch has developed a character design that satisfies not a high-graphic gaming experience but a fantastic low-graphic gaming experience. The brilliant optimization being done by the game developer has made the target group well expanded to cover most MOBA and FPS players. However, the game developers mostly have two common options, which are realistic and low-poly. Choosing either high-end headset players or low-end headset players is a potential challenge that is only accepted by one side of a group of VR players. In short, VR games are having a more challenging time while fighting against acceptance.

3.2. Competition

The market pressure in VR games seems more severe than the normal games and the limited range of games could be made into VR. While VR players are still a small percentage of gamers, there are lots of game studios that would be willing to endeavor. Each of them has a unique feature that would dominate the market. For example, VRChat, a dominating social network game that leaves no space for competitors, is the earliest social network game that enter the VR market. Not only the benefit of being the first VR social game but also the freedom for player-made content killed the stage. Different from other VR games, making wonderful maps on their own, VRChat has only made a few low poly maps but left the stage for the players. Being able to model the map or avatar for VRChat also evolved a commercial chain that gathered many model designers to do commissions. As a free Unity platform that offers free plugins for Unity to make easy uploads, modelers are all passionate about making and showing off their models as there has never been such a perfect platform [9]. In short, both thoughts and the chance to be the first player-made-content VR game, VRChat have shown the importance of unique features and opportunity. However, on the contrary, VRChat has kicked off any other game studios that would make the game like VRChat since VRChat is already a monopolized social VR game and still has no threats. In short, a unique and innovative mechanic undoubtedly being required to fascinate players.

3.3. Platform

In common, the platform of VR games is also limited, which serves a key role in entering the market as well. Currently, SteamVR is surely the first option no matter how many game platforms are publishing. Minecraft VR could serve as an example without a good platform. Three years ago, Minecraft published Minecraft VR with barely any advertising, they have maintained the ability to let VR players play with PC players. However, the lack of advertisement and using the website as a platform to publish this VR game has ended up with a failure no matter how compatible and designed Minecraft VR is. Not like the Oculus platform, which serves as a brand-special platform, SteamVR has expanded the targeted market into all VR headsets that can series connect to a computer. In Conclusion, unless the game is aimed at a specific platform to cooperate with, SteamVR is recommended.

4. Economy

While talking about the economy, VR is a type of game form to fulfill hope and expectations. Yet, the substantial initial investments and instability of the VR game market had advocated game studios fear the price of VR games.

● Uncertainties

Due to the uncertainties in the VR games market, game studios always fear initiating a long-term project to make a game like Half-Life Alyx, especially small sized game studios, making a VR game

project means transforming the game studio into a fully VR game development regardless of the risks waiting for them. Once a game studio has taken steps to develop a huge VR game project, there will be a huge number of unexpected situations to be encountered. In short, the immaturity of the VR game market evolved to such a high risk of failure, that a low-poly style is definitively recommended for those who want to start VR game development [9].

● **Funding Acquisition**

It has always been a headache for most game studios, but it is even more crucial in VR games. Getting money back by making VR games should be considered a challenge that needs to be cautiously determined. For example, while VRChat finally tried to make benefits not from stock but inside the game, they noticed that there was barely anything they could do about letting players buy.

● **Competition**

Competitors in VR games basically could be divided into two types of VR game development, the game developers making realistic VR games, and the game developers making low-poly VR games. Surprisingly, realistic VR games tend to have less competition than low-poly VR games do. As curious as the VR players, most of them have more passion for trying new games rather than sticking to one. However, on the contrary, while competing with the same game company that both make low-poly VR games that barely show differences, the mechanics of the VR games became competitive. Realistic VR games were meant to produce the game with the immersive 360 scene experience, which means the mechanic could not be essential to make the game successful. Back to Low-poly games, if all VR games look the same, and have unique mechanics that stand out from other games will be a challenge.

● **Short-term sustainability**

As mentioned earlier, all VR games turn out to have short-term sustainability due to the limitations of VR games respectively. In common, VR players get bored with a game fast that barely keeps players from going back to an old game. It is important to either make efforts to maintain and keep updating a good VR game, or focus on the speed of producing new VR games could be a tough decision. As VR games are still under development and waiting for new features, most players tend to try out new games instead of sticking to any of them. It is also an issue caused by most VR games being RPGs that don't have a lot of plots but Virtual reality mechanics.

● **Original Value of VR**

For VR games, it is necessary since VR players are still in increasing trends, some people joined VR and caught up with the old VR games. Initially, how virtual reality was developed with the support of the US government and the demand to have a virtual reality simulator before doctors get on a real surgery and a pilot on a real aircraft. This means that VR games have been developed with outside support to reach nowadays VR technology. So, the value of VR could be overwhelming as one explanation for nowadays low atmosphere of the VR market [10].

● **Publishing Region**

Compared to other countries, the United States is also the best market for VR Game publishing. In detail, the U.S. is one of the countries that maintains a high consumer ability from the data of the Steam platform. It has an excellent market environment and copyright protection for the game. As VR sells based on its creative features, the copyright maintains its weight. In addition, the U.S. also has the largest game community and a huge population of active players. Based on those letters, publishing VR games in the U.S. would also be beneficial.

● **Engine**

The choice of whether Unity or Unreal could be also hard to pick. An engine has defined the way the engine collects interests and the upper limit of your game. An unreal engine was hopeful for the future of VR as the performance of computer hardware and VR headsets got better. It will reach a new stage of virtual reality immersion, of course, coming with the rising price of good VR game quality. Nonetheless, an unreal game designer could be harder to find than a unity game designer and also come with a higher salary. Starting to make VR games also means the demand for fresh blood for the game studios.

5. Conclusion

Navigating the landscape of VR game development challenges for emerging game studios, from evaluating hardware limitations to crafting immersive and comfortable gameplay experiences, from meeting the demand for innovative storytelling, and addressing the complexities of marketing and economics, each challenge presents its unique way of to promote game developers choose wisely. Despite the nature of these obstacles, emerging game studios starting on the journey of VR development find themselves in a transformative era in gaming and have a chance to compete with famous game companies. By taking control of the power of innovation and vision, those game studios have the potential to be successful in the VR game field. In this rapidly evolving realm, the adaptability and creativity of emerging game studios will be essential. By embracing the challenges of VR game development as opportunities for growth and innovation, these studios can carve out their unique niche. As not being a pioneer on the frontier of a new era in gaming, the VR game market is still accessible for game studios to investigate. In conclusion, through strategic navigation of the challenges and firm commitment to their vision, emerging game studios own infinite possibilities to succeed in the VR game market.

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