Abstract

The e-sports industry has grown rapidly during the last few decades. The Coronavirus disease of 2019 (COVID-19) boosted people to stay at home, and a lot of people started playing and watching e-sports. During the pandemic era, the released metaverse and Non-Fungible Token (NFT)-based games were very popular. Therefore, examining how the metaverse and NFT will lead to the industry's rapid growth is considered. This research aims to identify the key antecedents of e-sports viewership and investigate the moderating effects of the metaverse and NFT on the relationship between behavioural intention and behaviour based on the theory of reasoned action. The survey was conducted in the Republic of Korea, and 327 people answered the questionnaire. Data were analysed by partial least squares structural equation modelling (PLS-SEM). The findings show the following discoveries. The belief was revealed to have a significant effect on attitude. It was also unveiled that behavioural intention is affected by attitude toward e-sports, subjective norms, attitude toward metaverse, and attitude toward NFT. Although people in Korea are interested in the metaverse and NFT, the result shows that the attitudes toward both metaverse and NFT do not moderate the effect of intention toward e-sports on behaviour. This study helps to understand how people think about the commercialisation of e-sports by two growth industries (i.e., metaverse and NFT).

1. Introduction

Video and online games have evolved into very popular industries since the late 1990s. Advances in local area network (LAN) technology have contributed the most to the popularity of e-sports. The tremendous evolution of LAN technology has succeeded in transforming the form of e-sports consumption into a form of human-to-human rather than a human atmosphere (Lee and Schoenstedt, 2011). Continuous developments in the Internet and software have made games accessible to more people, leading to the industry's rapid growth (Parshakov, 2015). In the early 2000s, competition among amateur athletes was the majority, but competition has become more and more specialised over time. At the same time, several countries such as the Republic of Korea and Germany began broadcasting e-sports games on TV. In Korea, local cable channels such as OnGamenet and MBC game were created, and GIGA Television was created in Germany (Lee and Schoenstedt, 2011). Seoul, the capital city of South Korea, is well known as the mecca of e-sports (Yu, 2015). This is because professional e-sports teams were founded and companies such as Samsung started sponsoring teams (Lee and Schoenstedt, 2011). Also, more than thousands of fans started attending competitions and tournaments to support their favourite teams and players (Cohen, 2009). Now, it has become an industry that generates more than billions of dollars through sponsorships, professional leagues, tournaments, franchises, teams, and players (Hedlund, 2021; Thiel and John, 2018).

E-sports refers to professional-level players playing video or computer online games in front of the public (Hollist, 2015). Over the past few years, the sports industry has made remarkable progress and has become a very popular sport. According to statistics, the number of global e-sports viewers in 2016 was estimated at 281 million, and about 380 million in 2018 (Kim et al., 2020). Especially among young people, e-sports has grown significantly as an alternative to watching other sports events (McTee, 2014). Over time, the age group who

watch e-sports has also become very diverse. According to statistics, the global number of e-sports viewers in 2022 is estimated to be 454 million, increasing by 15% every year. Zhang and Liu (2022) explained that in 2019, e-sports global streaming market sales recorded $456.7 million in sponsorship, $251.3 million in media rights, $19.2 million in advertising, and $103.7 million in goods and tickets, and $95.2 million in-game publisher fees. All the sectors are showing tremendous growth in sales. It also explained that the figure is growing by about 9.6% every year. According to GlobalWebIndex, 3 out of 10 Internet users watch e-sports live streaming played by other users or professional-level players, and when converted to actual figures, about 1.25 billion people were counted (Mangeloja, 2019). The growth of e-sports viewing has attracted the attention of millions of people on social media, and marketing lines such as T-shirt sales by e-Sports teams have been diversified. With the rapid growth of the e-sports industry over the past couple of decades, game publishers have begun to release games of various genres, and many different game players and viewers have become interested.

One of the promising and popular keywords that appeared in the year 2020 was metaverse. The metaverse is a compound word derived from the word “meta,” which means imaginary or abstract, and the “verse” which originated from the word “universe.” Metaverse has established itself as a space where users can communicate with each other using avatars created by users in the virtual space world. The metaverse and virtual space world have evolved to allow users to become avatars and interact socially and economically with multiple people in an online environment. Simply, the metaverse is a social space where users can talk to others online in a virtual space. Roblox is an online game that utilises technology. Over the past few years, online games have evolved into social spaces, and multiplayer games such as Roblox and Fortnite are not just software platforms for gameplay, but innovations that create a social environment in computer-generated spaces (Gonzalez, 2022). Epic Games, the game publisher of Fortnite, released a platform called “Party Royale” during the pandemic era. Unlike the game Fortnite, it is neither combat nor a violent game, but it provides online virtual spaces for users to enable talk to each other when physical socialising was not possible. It enabled players to make friends and play mini-games. Also, it is possible to make a community in the virtual spaces, so users could attend some events while staying home. In 2020, the company partnered with two artists, Travis Scott and Ariana Grande, and about 27.7 million fans attended the in-game concerts (Tassi, 2022). The forms of community have diversified by metaverse.

The non-fungible token (NFT) is one of the types of cryptocurrencies derived from smart contracts in Ethereum, built for the transaction-based mechanical concept of technology (Wood, 2014). NFT has different characteristics compared to Bitcoin which is a standard coin among all other coins. Bitcoins have the same values of equality as other coins and are indistinctive. However, NFTs have different systems. Creators can prove their existence and ownership easily. It is mostly created for digital assets in various areas such as videos, images, arts, and event tickets (Franceschet et al., 2021; Regner et al., 2019). Also, creators can make profits through peer-to-peer (P2P) trading. As of May 2021, the total sales purchased by consumers in the NFT market are estimated to be about $34,530,649.86 (Wang et al., 2021). Also, in 2020, the National Basketball Association (NBA) started selling players’ NFTs that are officially published by the organisation (Conti, 2022). The fans can

now make purchases of video clips of famous players. The development of NFT can also be found in the gaming industry. The newly developed NFT games which are called the play-to-earn (P2E) model have been played by many Filipinos as different sources of income, and the attractiveness that players felt convinced a lot of game developers to change from original online games to P2E formats of games. It has rapidly developed quite recently in the Philippines because of the economic crisis, so this reason has led to the national passion for NFT games (Wang et al., 2021). From this point on, NFT games in the Philippines have permeated the game industry well and revitalised the game market by launching more NFT games (Fitzjohn, 2022). The emergence of NFT-based games, especially in P2E formats, encourages many worldwide to participate in the e-sports market with interest.

The mathematically based model, the theory of reasoned action (TRA), provides information on the relationship between attitudes and behaviours. It was first introduced in 1975 by researchers Martin Fishbein and Icek Ajzen. The theory is mainly used for the predictions of how human beings will behave based on the gathered information which is attitudes to beliefs and subjective norms. Also, the TRA model explains the decision processes and how people make decisions between alternatives which are individuals' beliefs. This research is processed based on the structural model of the TRA. This is because the TRA provides a clear systematic framework for marketing and human resource management (Young and Kent, 1985). It is widely used in marketing to predict what people mostly make purchases between alternatives and is influenced by circumstances. The research from Buttle and Bok (1996) also described that TRA is used to formulate an effective marketing strategy. As the spread of the Internet and options for leisure life becomes more diverse, the population watching and enjoying e-sports has been increasing very rapidly since the late 1990s. Many companies and capitals invest to target professional clubs and fans in e-sports. In addition, the routes for transmitting games have become very diverse, and there have been many platforms to access the games. Recently, the metaverse, one of the most promising industries, is also considered one of the methods to enjoy e-sports. It is considered to be the industry that made the greatest progress during the pandemic era. The NFT also received attention from countless people during the era. This field also recently entered the e-sports industry and has attracted countless people. However, the advent of these new industries cannot be said to have fascinated all existing e-sports viewers. This is because the controversy over metaverse and NFT continues. Some people who were not interested in e-sports may want to watch because of the advent of two new industries. On the other hand, the old supporters and viewers may think that they will not watch because of the awareness of differences and unfamiliarities.

The research aims to figure out how the two moderating factors the metaverse and NFT will change the viewership of e-sports. The published research focuses on the motivators of watching e-sports, so it is needed to investigate how viewership will be changed since the two concepts (i.e. metaverse and NFT) have been commercialised through a plethora of platforms. The behavioural theory-based model, the TRA model, is used to identify the antecedents of behavioural intention. Moreover, the current study explores how the effects of components in the TRA model would be moderated by metaverse and NFT. This research and the analysis results will provide a clearer explanation for understanding the behaviours of e-sports viewers and the impacts of the metaverse and NFT.

The organisation of this paper is as follows. Chapter 2 covers a literature review which contains information on the context of e-sports, behavioural theories, metaverse, and NFT. Chapter 3 describes the hypothesis of this paper. Chapters 4 and 5 explain the methodology and research results, respectively. Chapter 6 discusses the findings of the investigation. Lastly, Chapter 7 contains the summary, the theoretical contributions, implications, limitations, and future directions.

2. Literature Review

As interest in e-sports increases, various studies have been conducted in academia (Kim et al., 2020). Some studies have focused on finding factors for increasing participation in e-sports (Xiao, 2020), while others have studied the motivations of e-sports visitors (Yee, 2006). Several papers have been introduced that have participated in the e-sports industry and market and attempted theoretical approaches to causes or motivations (Sjöblom and Hamari, 2017). However, not many studies have been published on how factors such as metaverse and NFT, which are still in the growth stage, can affect e-sports viewing.

2.1 E-sports

In this section, some existing literature on e-sports is covered. Specifically, what kind of experiences e-Sports provide viewers and how it has grown are explained. In addition, motivation to watch e-sports and how COVID-19 has changed the e-sports industry is examined based on previous studies.

Seo (2013) revealed that engagement in activities related to e-sports offered consumers a diversified experience, and described that 4E (entertainment, education, escapism, and esthetics) are interrelated to experiencing e-sports. The researcher also found the degree of various experiences in which all four areas are all connected. Previously published studies primarily focus on experiences that are usually based on computer-generated circumstances; however, the theory shows marketers that they need to study and understand the consumption of e-sports in many different aspects. The researcher stated that 4E is helpful to identify how companies or marketers target e-sports viewers by increasing the attractiveness of experiences that people are most interested in.

Before investigating what are the motivators and how to attract viewers, several indicators of the success of e-sports should be covered. Kim et al. (2020) found the result that the economic impact of e-sports is quite huge. It is estimated that about 204 million audiences watched e-sports in 2014 and about $194 million of revenue was recorded in the global e-sports market. In 2018, about 427 million people watched the e-sports world widely, and about $1,072 million was recorded (Kim et al., 2020). In terms of the viewership aspect, 13.6% has grown, and 24.2% has increased in terms of revenue in the last few years (Kim et al., 2020). In the early years, most of the revenue occurred from marketing, but now it has extended to various areas such as media rights, merchandising, and ticket sales (Parshakov and Zavertiaeva, 2018). For this reason, attracting more viewers is becoming important.

Also, there are several theoretical approaches such as perceived enjoyment, hedonic motivation, and perceived behavioural control to figure out what and how motives viewers lead to watch. From the perceived enjoyment point of view, acknowledged information that

they have is quite important to the behaviour. The results explain when viewers have positive memories from a previous experience, they watch e-sports.

Sutton (1998) explained that retrieved information from one's memory becomes an opportunity to affect one's behaviour. In terms of hedonic motivation, it is found that they watch e-sports if they want to do something interesting and to escape from their boring daily life.

Yee (2006) delivered the research that playing and watching e-sports are good ways to forget about stressful elements of daily life. The authors suggested achievement, socialisation, and immersion as the main contributors to playing e-sports. In respect of high perceived behavioural control which refers to the willingness of watching e-sports, the results revealed that it led to the behaviour. To be specific, if they have a strong will or purpose to engage in watching, it will result in watching. Radman Peša et al. (2017) suggested marketing strategies which are competitiveness, social networking, and commitment based on the factors. The first selectable marketing strategy in the e-sports industry is utilising the competitiveness of video and online game users based on achievement. The second marketing approach is social networking which is based on socialisation. The third marketing approach is commitment based on engagement. Immersion in the context means that an individual is immersed in-game content. Some motivations are triggered by watching others playing. Hundreds and millions of people use Twitch, a live streaming platform, to spend time watching video games or other online games over the Internet (Hamari & Sjöblom, 2016). It is also revealed that waiting for the results while watching is interpreted as a very positive signal because the tension is quite relieved, so it enabled viewers to keep watching the game for a few hours (Sjöblom and Hamari, 2017).

Jóźwiak (2022) described that the coronavirus disease of 2019 (COVID-19) pandemic boosted the development of e-sports. Several big tech companies, such as Microsoft, Google, Amazon, and Tencent, launched cloud-based e-sports gaming platforms in 2020 when COVID-19 was pervasive. Platforms gained huge popularity as the time spent inside the house increased during the pandemic. After that, e-sports attracted more sponsors, and it is more advantageous than conventional sports since they can reach various fan bases (Chen, 2021). Banaszak et al. (2020) forecasted that e-sports will become the backbone of the digital and electronics economies in the next five years. E-sports will grow in many aspects such as finance, geography, and demographics.

Even before the pandemic era, the e-sports industry has steadily grown. On the other hand, COVID-19 encouraged the growth of the e-sports industry. Also, various marketing strategies have emerged to target viewers since the population of viewers is increasing every year. Therefore, grasping viewers' behavioural intentions are required, and a reliable theoretical approach and a study is necessary.

2.2 Behavioural Theories of e-sports participants

The four models of behavioural theories about e-sports users are previously investigated and studied.

2.2.1 TRA

TRA model helps to explain and expect one's behaviour based on the factors (Fishbein and Ajzen, 1977). To be specific, before people behave, there are several stages. According to the model, behavioural beliefs and evaluations of behavioural outcomes affect attitude toward behaviour. Normative beliefs and motivation to comply affect subjective norms. Then, attitude toward behaviour and subjective norms affect behavioural intention, and the intention affects one's behaviours. As a result, the model usually is used to predict one's behaviour for studies. The authors also claimed that there are important relationships between acknowledged information and behaviour in value. The study shows that escapism is one of the key consumption motivators to watch e-sports (Klimmt et al., 2009). Xiao (2020) exploited the TRA model to explain the motivators of watching e-sports. The predictors and factors are composed based on the factors of watching conventional sports. Xiao (2020) divided behavioural beliefs into six factors which are achievement, knowledge, aesthetics, drama, escapism, social, and normative. In the case of e-sports viewership, the result reveals that the person with a strong intention may watch e-sports games. The findings from the research are helpful and useful for e-sports industry incumbents. For instance, online game developers who need to plan and input fun factors into the games need to consider consumers' motivations to play and watch games. Also, marketers who work in the e-sports industry will need to refer to the research because they can find some ways to attract consumers. They can find keywords on how to stimulate potential audiences and engage in events and gaming events.

2.2.2 Theory of Planned Behaviour

The theory of planned behaviour (TPB) is developed from TRA. TPB is also well-known for the model of analysing one's behaviour and predicting one's behaviour based on the input which are subjective norms and attitudes toward behaviours that influence behavioural intention. TPB is a complemented version of the previous model which is TRA. Ajzen (1985) revealed in the study that there is a limit on the TRA model which refers to it would be difficult to lead to action if an individual's control ability was poor or if it was difficult to implement due to differences in external factors such as technology, information, and time margin required for execution. As a result, the variable, perceived behavioural control (PBC), was added. PBC is a concept that includes not only subjective norms but also external factors such as time and information. To apply the TPB model, Leung et al. (2021) used the TPB model to analyse what are the factors and motivators of engagement in e-sports. The research investigated not only the motivators or factors that make people who already have experiences of watching e-sports engage in e-sports but also the demotivators or factors that make people not engage in e-sports (Leung et al., 2021). Also, the model has been applied to different studies to investigate the intention of various types of sports. In turn, TPB is a reliable model and it is widely used in many areas to figure out the intentions to engage in participation.

2.2.3 Technology of Acceptance Model

The technology of Acceptance Model (TAM) was firstly founded by Davis (1989) to interpret the acceptance behaviour of technology. TAM is one of the effective ways to analyse the behaviour patterns of human beings (Davis, 1989). The model has been developed and

applied in various information technology (IT) areas (Awa et al., 2015; Altin et al., 2018). Also, a lot of studies are already conducted by utilising TAM or modified models to describe people's acceptance of technological systems based on the motivators and variables (Lin and Lu, 2000; Moon and Kim, 2001; Koufaris, 2002). Davis et al. (1989) revealed that ease of use and usefulness are important elements for the decision of behaviours. Hsu and Lu (2004) applied the TAM model to explain how online game has become successful in terms of the entertainment industry. The researchers used not only perceived usefulness and perceived ease of use but also added other social factors such as social norms, and critical mass. Additionally, flow experience was added for the variables. Through the research, they found that the variables positively influence the intentions to play online games (Hsu and Lu, 2004). In conclusion, TPB has been conducted by many researchers in previous studies, and it is also well used to define the participation of the e-sports industry as well.

2.2.4 The Unified Theory of Acceptance and Use of Technology

To improve the limitations of TAM, Venkatesh et al. (2003) approached consumers' or users' acceptance of technology from integrated perspectives and ultimately proposed the model called the unified theory of acceptance and use of technology (UTAUT) which is to explain specifically the acceptance of technology. Venkatesh et al. (2012) extended the first paper about UTAUT and proposed UTAUT2. Individual differences such as gender, age, experiences, and names are added for moderating effects, and constructs such as price value, habit, and hedonic motivations are added (Venkatesh et al., 2012). The modified theory was applied in the case of the e-sports viewership investigation. Jang and Byon (2019) utilised the e-sports consumption model (ESC) which is based on the UTAUT2 model to investigate the motivators and determinants of consumption of e-sports events and gameplay. The study was processed by dividing determinants into six triggers which are social influence, price value, flow, effort expectancy, hedonic motivation, and habit. They revealed in the paper that they applied UTAUT2 because participating in e-sports gameplays and events all includes the requirement of adapting new technologies such as software and hardware systems of games (Jang and Byon, 2019). The researchers evaluated that although the ESC model is not common and widely used, they proposed it is a decent framework to find determinants of consumers' intention to engage in e-sports gameplay and events.

2.3 Metaverse

The metaverse is a combination of the words "meta," and "universe." Snow Crash, the novel which is written by Stephenson, very first introduced the term metaverse and it was depicted as a three-dimensional virtual space where avatars live (Abed and Rinkevic, 2022). Some people believe the metaverse is a replaceable word for virtual reality (VR) and augmented reality (AR) (Park and Kim, 2022). However, it refers to where people can socially connect through virtual spaces (Hwang and Chien, 2022). Although the metaverse is currently considered an industry which is full of uncertainty for the future, workers in the e-sports industry believe the metaverse will be an opportunity for businesses as a servicescape (Abed and Rinkevic, 2022). Also, Papagiannidis et al. (2008) emphasized the realization of large-scale multiplayer online role-playing games as the metaverse. Numerous online game users around the world can interact through the virtual space metaverse, and

these business platforms and industries can generate huge revenues (Papagiannidis et al., 2008). Akour et al. (2022) contend that users' intention to use the metaverse system is strongly supported these days. Park and Kim (2022) emphasise what is currently available for users and why this is necessary for the future. It is revealed through the research that participation in the metaverse enhances audiences' experiences (Abed and Rinkevic, 2022).

2.4 Non-Fungible Token

The non-fungible token (NFT) is known as a new type of blockchain-based cryptocurrency (Fairfield, 2022). Its popularity has led to the creation and sale of products such as celebrity endorsements, collectables, and play-to-earn (P2E) games, and it created communities for token holders to offer values of tokens (Fisher, 2022). The cryptocurrencies such as Bitcoins are having the same values as dollars, however, NFT implicit different information compared to any other fungible tokens (Macey and Törhönen, 2019). NFTs are connected in the form of graphics interchange formats (GIF), videos, audio, and texts, which are classified as one digital asset value (Nadini et al., 2021). This format of financial gaining is prevalent in the e-sports industry as well. NFT games are developed and released very recently (Wang et al., 2021). The people in the Philippines tend to play P2E games because of incidental income through selling NFTs (Gill, 2021). For example, Francisco et al. (2022) introduced the popularity of play-to-earn games and NFTs in the Philippines and evaluated that further research must be conducted to understand how NFTs and cryptocurrency affect the level of interest and participation. This was not a popular type of game in the past, but the author also described that the pandemic boosted the rise of the games that are related to NFTs (Francisco et al., 2022). As interest picks up in terms of the cryptocurrency-related gaming industry, it is getting important to investigate how people think about NFT.

3. Conceptual Model

In this research, the TRA model is adapted and applied to figure out the moderating effects of viewership of e-sports. Through the reviewing of the development of the behavioural theories about e-sports, the research model in Figure 1 is created. The following paragraphs will cover the hypothesis of each construct.

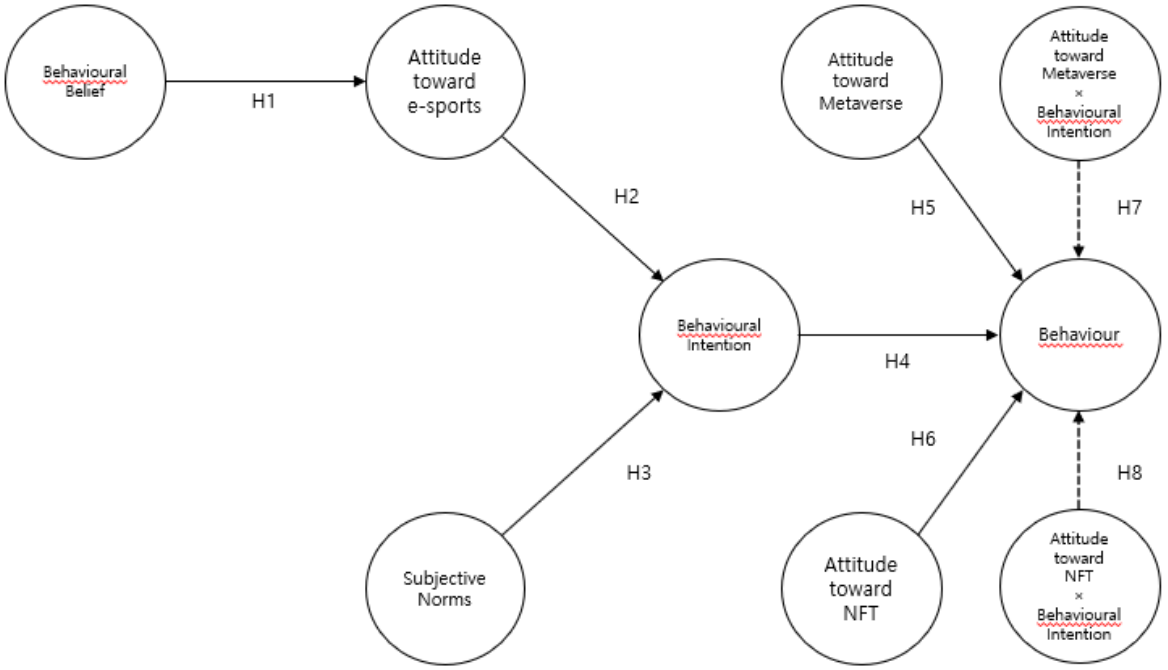

Figure 1. Research Model

3.1. Behavioural Belief

According to the TRA framework, behavioural belief influences attitude toward behaviour (Fishbein and Ajzen 1977; Fishbein et al., 1980). A recent study proposed that beliefs strengthen attitudes toward behaviour (Jang and Byon, 2019). In the case of e-sports, when viewers have a stronger level of belief, a more favourable attitude toward e-sports will be formed. By the previous findings, this study suggests that belief enhances the level of attitude. Therefore, this study proposes the hypothesis as follows.

H1. Belief significantly influences attitude.

3.2. Attitude Toward E-sports

The TRA model explains that the attitude toward a behaviour is one of the factors that influence behavioural intention (Fishbein and Ajzen 1977; Fishbein et al., 1980). The behavioural intentions of viewers are enhanced when viewers start showing a favourable attitude toward e-sports (Leung et al., 2021). By referencing the empirical study, this study applies and proposes the hypothesis as follows.

H2. Attitude toward e-sports significantly influences behavioural intention.

3.3. Subjective Norms

Subjective norms are defined as individuals' views or opinions that are perceived by the circumstances that are important to the persons (Marta et al., 2014). Prior studies have found positive correlations between subjective norms and behavioural intention. According to the study in terms of regular sports, groups' norms positively influence football fans' purchase intentions (Madrigal, 2000). From the e-sports point of view, if more viewers watch,

it can increase the level of behavioural intention. For the following reasons, the hypothesis below is posited.

H3. Subjective norms significantly influence behavioural intention.

3.4 Behavioural intention

TRA model presents that behavioural intentions are influenced by an attitude which is influenced by one's beliefs and subjective norms (Fishbein and Ajzen, 1977). Also, the studies unveiled behavioural intentions are great sources of actual behaviours (Ajzen and Fishbein, 1977; Fishbein et al., 1980). One study held up as an example that people who have more intention to play games participate in games more (Jang et al., 2020). Based on the suggested study, it is supposed audiences will watch games if their behavioural intention increases. Therefore, this research proposes the following hypothesis.

H4. Behavioural intention significantly influences behaviour.

3.5 Attitude Toward Metaverse

COVID-19 and the development of technologies have boosted the attention of the metaverse not only to e-sports fans but also to people from different areas (Park and Kang, 2021). As the interest in the metaverse increases, the game industry is also focusing on the trend (Vidal-Tomás, 2022). It is getting necessary to understand how e-sports viewers think about the metaverse. This is because the metaverse can influence the viewership of e-sports. Therefore, in this research, the following hypothesis is posited.

H5. Attitude toward the metaverse significantly influences behaviour.

3.6 Attitude Toward NFT

NFT has now become the mainstream industry that both industry and science are paying attention to within the cryptocurrency market over the past few years (Vidal-Tomás, 2022). The development of games in the area of NFT led a lot of people to engage (Fowler and Pirker, 2021). The current tendency can influence the viewership of e-sports. For this reason, the hypothesis below is formulated.

H6. Attitude toward NFT significantly influences behaviour.

3.7 Moderating Effects of Attitude Toward Metaverse and NFT

In general, viewers form pure fun in watching e-sports, cheering teams, and the self-projection of players. In terms of the viewers, e-sports will simply be more culturally meaningful than commercial purposes. Viewers watch e-sports for fun or to build relationships with friends. As Metaverse and NFT recommend viewers derivative products commercialize game items more and more, viewers may resist accepting. In this context, the commercialisation of e-sports reflecting metaverse or NFT may cause viewers to reject watching. Therefore, this study proposes the following hypothesis.

H7. Attitude toward the metaverse significantly moderates the effect of behavioural intention on behaviour.

H8. Attitude toward NFT significantly moderates the effect of behavioural intention on behaviour.

4. Research Methodology

4.1 Instrument Development

The questionnaire was processed to analyse the proposed model. The model is based on the TRA model, and the moderating effects which are the metaverse and NFT were added between behavioural intention and behaviour. The metaverse and NFT are measured as attitudes toward each item. To be specific, the investigation was based on finding what elements make people watch e-sports and to find how viewers' final behaviours will be changed if two industries are engaged in e-sports. To clarify the research model which concludes behavioural theories, the precedent research was referred to design the items. The questions are moderated to make them proper for respondents since the constructs are based on e-sports. Also, the questionnaire was reviewed by an expert on the TRA model. All the items of the questionnaire were measured based on a seven-point Likert-type scale (1=strongly disagree, 7=strongly agree). The questionnaire was firstly written in English, and the author translated it into Korean. Also, the Korean language questions were reviewed by experts from the research institution. The people who watched e-sports matches at least once were surveyed. To make sure that they experienced watching e-sports, the first question which was located after asking demographic information was written asking whether they had watched before or not. If they did not have any experience engaging in watching e-sports, those respondents were not counted.

4.2 Subjects and Data Collection

The questionnaire was conducted by requesting a specialised survey institution in the Republic of Korea in mid-week of June 2022. A total of 327 Korean e-sports viewers who have watched e-sports at least more than once were selected for data analysis. The demographic information of the final data is presented in Table 1.

Table 1. Profile of respondents

Demographics	Item	Subjects ($N = 327$)	
		Frequency	Percentage
Gender	Male	282	86.24%
	Female	45	13.76%
Age	20 - 29	30	9.17%
	30 - 39	113	34.56%
	40 - 49	119	36.39%
	50 - 59	65	19.88%
Average Income per Year	$0 - $24,999	52	15.9%
	$25,000 - $49,999	99	30.28%
	$50,000 - $74,999	84	25.69%
	$75,000 - $99,999	62	18.96%
	$100,000 - $149,999	16	4.89%
	$150,000 - $199,999	7	2.14%
	$200,000 above	7	2.14%

To summarise the profile of respondents, a total of 327 people participated in the questionnaire, and there are three parts of the demographic information which are gender, age, and average income per year. In terms of gender, 282 males and 45 females replied to the questionnaire. Those in their 30s and 40s accounted for the largest number of respondents, those in their 20s accounted for 9.17%p they were the smallest number of respondents, and those in their 50s accounted for about 20%. From the perspective of average income per year, among the respondents, the largest number of people with an annual salary of $25,000 to $49,999 was the highest, and the second largest number of people with an annual salary of $50,000 to $75,000 was the second highest, and the third largest number of people with a salary of $75,000 to $99999 was the third highest. People with an annual salary of $150,000 or more accounted for about 4% and followed by those who accounted for about 16% with an annual salary of less than $24,999. In summary, most of the respondents were men, the highest percentage of the age groups were the 30s and 40s, and lastly the highest percentage of annual salaries, on average, was more than $25,000 and less than $75,000.

5. Research Results

The result is analysed by the Partial Least Squares (PLS) method to verify the model and the hypotheses. The reason why the PLS method is used for this research is that it enabled the researcher to reckon with the complicated model as such this research model has many constructs, variables, and paths except applying the distributional speculation on the data. Hair et al. (2012) explained the advantage of the PLS technique is that there are fewer restrictions on the distribution of sample sizes and residuals compared to Linear Structural Relations (LISREL) and Analysis of Moment Structures (AMOS) which are based on the structural equations of covariance methods. It is known as the most effective way for multivariate calibration because it is well known for ease of implementation (Zhao et al., 2018). Also, according to the research, about 20,000 papers which are analysed by the PLS method were published between the years 2005 and 2017 (Zhao et al., 2018). For the

following reasons, the research method is a methodology that has been proven for a long time.

5.1 Measurement Model

The measurement model is used to identify the discriminant validity of measurements, convergent validity, and reliability. Composite Reliability (CR) and Average Variance Extraction (AVE) were computed for credibility. Fornell and Larcker (1981) suggested that the reliability corresponds if the value of CR is higher than 0.70 and the AVE is higher than 0.50. The CR and AVE values of the factors that are marked in table 2 represent that it accords with a reliability satisfaction value. Then, Hair et al (2019) stated if the factor load of the questionnaire items is 0.70 or higher, the convergent validity was satisfied. Since all the factor loading from table 2 represents higher than 0.70, convergent validity is verified. Last but not least, if the square root of AVE is higher than the correlation value, then the discriminant validity is valid (Fornell and Larcker, 1981). The computed variance inflation factors (VIFs) of constructs show that multicollinearity is not a considerable issue.

Table 2. Scale reliabilities.

Construct	Items	Mean	St. Dev.	Factor Loading	Cronbach's Alpha	CR	AVE
Belief	BLF1	5.064	1.154	0.856	0.730	0.880	0.785
	BLF2	4.602	1.227	0.915			
Attitude toward e-Sports	ATE1	4.878	1.258	0.876	0.895	0.927	0.760
	ATE2	4.621	1.265	0.874			
	ATE3	5.009	1.289	0.865			
	ATE4	5.336	1.148	0.872			
Subjective Norms	SNO1	4.165	1.462	0.863	0.848	0.908	0.766
	SNO2	4.446	1.449	0.875			
	SNO3	3.713	1.709	0.887			
Behavioural Intention	BIT1	4.517	1.454	0.905	0.897	0.936	0.829
	BIT2	4.352	1.489	0.921			
	BIT3	4.777	1.316	0.905			
Attitude toward Metaverse	ATM1	5.086	1.248	0.932	0.894	0.934	0.825
	ATM2	5.165	1.220	0.910			
	ATM3	4.807	1.277	0.881			
Attitude toward NFT	ATN1	4.563	1.325	0.931	0.917	0.948	0.858
	ATN2	4.642	1.351	0.935			
	ATN3	4.502	1.423	0.913			
Behaviour	BEH1	5.125	1.336	0.783	0.775	0.870	0.692
	BEH2	4.844	1.367	0.903			
	BEH3	4.174	1.592	0.804			

Table 3. Correlation matrix and discriminant assessment.

Constructs	1	2	3	4	5	6	7
1. Belief	0.886						
2. Attitude toward e-Sports	0.709	0.872					
3. Subjective Norms	0.640	0.583	0.875				
4. Behavioural Intention	0.593	0.731	0.595	0.911			
5. Attitude toward Metaverse	0.433	0.558	0.412	0.467	0.908		
6. Attitude toward NFT	0.450	0.515	0.499	0.477	0.690	0.926	
7. Behaviour	0.555	0.736	0.589	0.791	0.607	0.647	0.832

Note: The square root of AVE values is shown on the diagonal. *: $p < 0.05$; **: $p < 0.01$

5.2 Structural Model and Hypothesis Testing

The constructs structured by PLS and hypothesised were testified by structural equation modeling (SEM). The Bootstrap resampling method (500 subsamples) was processed for the significance of hypotheses in the research model. Figure 2 represents the results of PLS-SEM. As expected, behavioural beliefs significantly affect the attitude toward e-sports, accepting H1. Inconsistent with the hypothesis, behavioural intention is influenced by both attitudes toward e-sports and subjective norms, thus supporting H2 and H3. Behavioural intention significantly affects behaviour, resulting in the acceptance of H4. The interesting parts of the result are that the viewers' attitudes toward the metaverse and NFT impact the continuance of intention toward watching e-sports. Hence, H5 and H6 are adopted. Unlike the expectations, "attitude toward metaverse and behavioural intention" and "attitude toward NFT and behavioural intention" do not impact the behaviours. Therefore, H7 and H8 are not supported. The proposed model accounts for 73.2% of the variance in behaviour. Table 4 is the summary of the results.

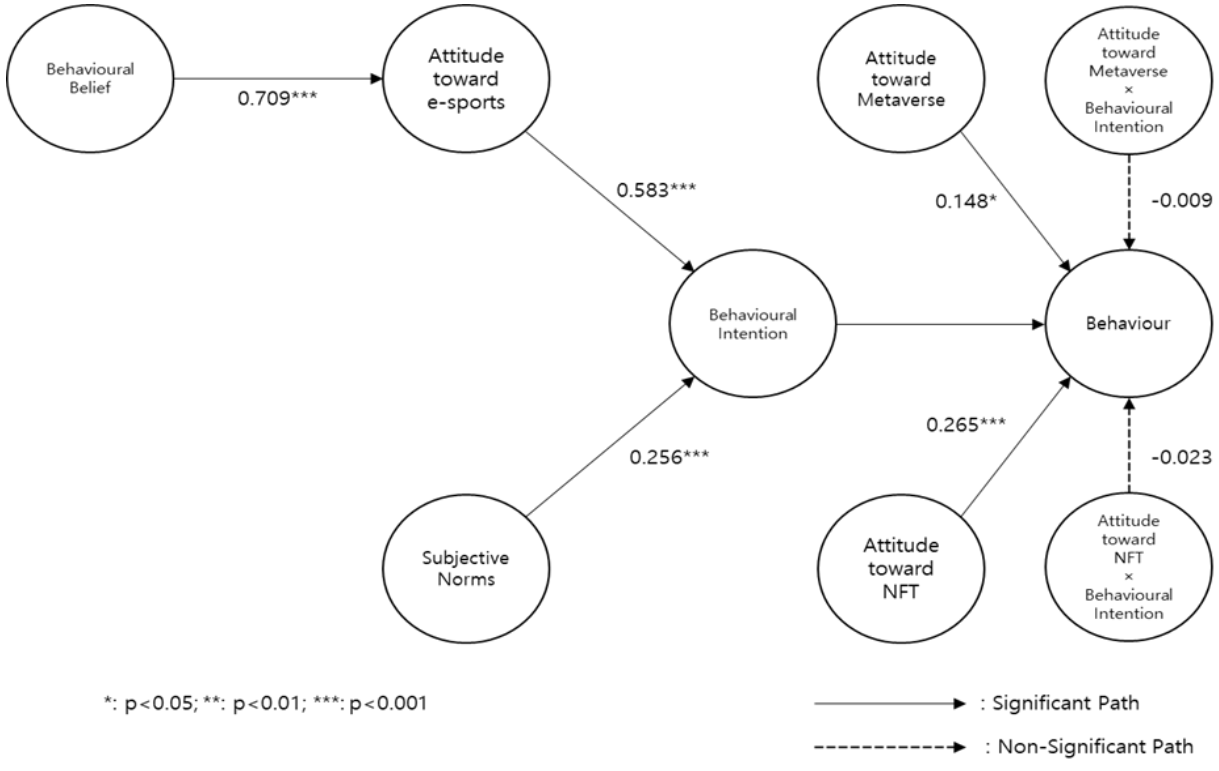

Figure 2. Analysis results

Table 4. Summary of the results.

H	Cause	Effect	Coefficient	T-value	Hypothesis	Star
H1	Belief	Attitude toward e-Sports	0.709	16.268	Supported	***
H2	Attitude toward e-Sports	Behavioural Intention	0.583	8.948	Supported	***
H3	Subjective Norms	Behavioural Intention	0.256	4.181	Supported	***
H4	Behavioural Intention	Behaviour	0.596	13.047	Supported	***
H5	Attitude toward Metaverse	Behaviour	0.148	2.303	Supported	*
H6	Attitude toward NFT	Behaviour	0.265	4.653	Supported	***
H7	Attitude toward Metaverse × Behavioural Intention	Behaviour	-0.009	0.127	Not Supported	Not Supported
H8	Attitude toward NFT × Behavioural Intention	Behaviour	-0.023	0.376	Not Supported	Not Supported

6. Discussion

The theoretical approach refers to the e-sports viewers' motivations and how those behaviours will be interpreted. Also, how the moderating effects which are the metaverse and NFTs are interacted with viewership will logically be exposited.

- Hypothesis 1

Consistent with the expectation, the belief was revealed to affect attitude toward e-sports significantly. Hence, hypothesis 1 is supported, and the result from this research is consistent with the findings from Xiao (2020). This could be explained by the fact that the attitude toward e-sports increases when the viewers' personal beliefs get stronger. The audiences seem to form a strong belief when the teams or players they support play better. In line with the finding of the current study, Comisky and Bryant (1982) found that the liveliness of sports matches stimulates fans to become more enthusiastic about the games. As a result, it forms a favourable attitude toward e-sports as a whole.

- Hypothesis 2

The attitude was found to influence behavioural intention significantly, thus hypothesis 2 is supported. These findings are also consistent with the results of Xiao (2020). This observation might refer to the reason that viewers with a higher level of attitude towards e-sports have a greater degree of behavioural intention. According to Jeong and Choi (2005), if people are fascinated by what they like or are favourable to something, it highly influences their behavioural intention. Also, Koering (2003) argued that salespeople could get a positive

response from consumers if they liked products or services. If the audiences are becoming more favourable to e-sports, they want to watch and participate more in it.

- Hypothesis 3

From the subjective norms point of view, the result above was also found to significantly influence behavioural intention. Therefore, hypothesis 3 is also supported, and this finding also accords with the results of Xiao (2020). This outcome was implicit that viewers' relationships between circumstances affect their watching. As more people around someone watch e-sports, their behavioural intentions increase. This is because they believe they can socially engage with people through watching e-sports. This finding can be supported by previous studies. McDonald et al. (2002) revealed that social interaction was found when sports fans have conversations while they are watching sports games. Also, Chang (1998) developed the idea of behavioural beliefs and argued that people can learn behavioural beliefs from common circumstances who have. Moreover, McPherson et al. (2001) explained that sharing one's ideas such as watching e-sports can be helpful in terms of companionship. As a consequence, the subjective norm highly affects behavioural intention.

- Hypothesis 4

Behavioural intention considerably affects behaviour. In other words, hypothesis 4 is supported as well, so it means that behavioural intention strongly influences viewership of e-sports. In the construct, the context inheres what makes respondents who have at least watched e-sports once before they watch. The result shows as much as they think and plan to watch, it leads to the behaviour. According to Wu and Liu (2007), the enjoyment of playing online games not only influences behavioural intention but also is effective to predict one's behaviour. Jolaee et al (2014) described when opportunities that are wills or purposes arise, it is expected that people carry out the behaviour. The findings from this research also show when viewers have enough resources, time, and opportunities to engage in watching e-sports, it is indicated to influence their behaviour as well.

- Hypothesis 5

The research found that the respondents' attitude toward metaverse influences watching e-sports. Therefore, hypothesis 5 is supported. As the rate of viewers who agree with commercialising e-sports by metaverse increases, it influences their behaviour. Also, as more people believe it is valuable, pleasant, and enjoyable, it makes more viewers watch e-sports.

- Hypothesis 6

Equally, an important consequence is that hypothesis 6 is supported by the same theoretical point of view. It refers to the attitude toward NFT influences on behaviour. The results show that if more people believe the commercialisation of e-sports is positive, more people will watch it. As in the case of the metaverse, the results suggest that the more people think of NFT as valuable, pleasant, and interesting, the more it influences behaviour.

- Hypothesis 7 & 8

The last point worth noting is that hypotheses 7 and 8 are not supported. Although respondents think that commercialising e-sports by metaverse and NFTs are amusing for them, the final result exhibits viewers' ideas that they are not interested in watching e-sports when the metaverse and NFTs have become involved in the industry. Overall, the results of the questionnaire have shown that e-sports viewers get favourable responses toward the metaverse and NFTs. However, the investigation shows that the respondents will not watch e-sports. Furthermore, they will not watch it if it is based on the metaverse. Finally, the result is that the e-sports-based NFT products will not be purchased by viewers.
To sum up the analysis, 6 out of 8 hypotheses were found to be supported. The behavioural belief strengths influence the attitude toward e-sports. Attitude and subjective norms positively affect behavioural intention. Then, the meaning significantly affects behaviour. At the same time, attitude toward metaverse and NFT also influence the behaviour as well. Attitudes toward metaverse and NFTs do not moderate the effects of behavioural intention viewership of e-sports.

7. Conclusion

7.1 Summary

This study aims to analyse the behaviour of e-sports viewers and to investigate how the final behaviour would change by adding moderating effects such as metaverse and NFT. The subjects of the study were exactly 327 people who watched e-sports more than once, and the questionnaire was conducted through a South Korean survey institution. In terms of hypotheses verification results, all but two hypotheses were adopted. Through this result, it is a study that allows people who watch e-sports to find out about their motives and what they think about e-sports. In addition, before it led to action, it was possible to find out the attitudes of e-sports viewers toward the two growth industries, the metaverse and NFT. The study reveals what the viewers think about those social trends. However, the final data shows that the two hypotheses based on metaverse and NFT are not directly linked to the behaviour.to analyse the behaviour of e-sports viewers and to investigate how the final behaviour would change by adding moderating effects such as metaverse and NFT. The subjects of the study were exactly 327 people who watched e-sports more than once, and the questionnaire was conducted through a South Korean survey institution. In respect of hypotheses verification results, all but two hypotheses were adopted. Through this result, it is a study that allows people who watch e-sports to find out about their motives and what they think about e-sports. In addition, before it led to action, it was possible to find out the attitudes of e-sports viewers toward the two growth industries, the metaverse and NFT. The study reveals what the viewers think about those social trends. However, the final data shows that the two hypotheses based on metaverse and NFT are not directly linked to the behaviour.

7.2 Theoretical Contributions

This study has the following academic contributions. First, this study contributes to the existing literature in that empirical analysis was conducted by applying the theory of reasoned action to explain the behaviour of e-sports viewers. Unlike existing academic studies, conditions such as various forms of variables that can affect the behaviour of various

e-sports viewers were added for the approach to the research. Researchers can utilise the results of the present study to integrate the constructs in TRA and e-sports-specific variables for explicating mass media culture.

Second, it adds a new contribution to the academic world by analysing how e-sports viewers think about metaverse and NFT by using moderating variables. There are many studies on metaverse and NFT-related content, but there have been no studies on what e-sports viewers think and how behaviour changes accordingly. It can be data that enables people in the e-sports industry to predict what viewers who are participating in the e-sports market will think about the two industries for the future market. Scholars need to investigate the critical levels of commercialization of metaverse and NFT to optimize the business and pure sports.

Last, this study significantly secured the generality of the study because the investigation is processed in the Republic of Korea which is the powerhouse of e-sports. The biggest market for competitive games is located in Korea. It integrated e-sports into mainstream culture faster than any other country during the Internet penetration period, and now it is gaining status by monopolising titles in various international competitions such as League of Legends World Cup and Overwatch World Cup (Kil and Yoo, 2017). The fact that the e-sports powerhouse conducted a survey means that it can approach more diverse age groups or consumers than other countries and listen to their thoughts. As shown in the profile of respondents' statistics, many responses were obtained from people in their 30s and 40s as well as those in their 20s. Also, it was able to investigate the opinions of people in their 60s. It is meaningful that by conducting research in countries where e-sports are already widely commercialized, people who already know about e-sports could easily access it and obtain their thoughtful thoughts.

7.3 Theoretical and Practical Implications

By reviewing this research, the viewers' strong belief affects their attitude toward e-sports. Strong belief in this context refers to feelings and pride while watching e-sports. The result shows and interprets that the intensity of emotions felt by viewers makes them more committed to e-sports. Next, one of the two factors that can have a lot of influence on behavioural intention is the attitude toward e-sports. When respondents watch more, feel valuable, happier, and more interesting, it is strongly connected to behavioural intentions. Another one that intensively influences behavioural intention is subjective norms. The result presents that their social circumstances affect their intention. As people around viewers watch e-sports more, the frequency of engagement for watching e-sports has been shown to increase. After, there are two moderating effects in this research which are the metaverse and NFTs. In terms of the two growth industries, the respondents believe and feel that they were found not to be hostile to the commercialisation of e-sports by the metaverse. Also, they think it is valuable, pleasant, and interesting. Unlike as much as they consider the two variables favourable, the result revealed that it does not affect the behaviours. People replied that they would not watch e-sports that are based on metaverse, and make purchases of NFTs based on e-sports.

This research shows data that can suggest directions to business people or marketers in the e-sports industry on what the future demand from fans will be. Since the emergence of

e-sports, various game genres have been released. Roblox, which is a metaverse-based game, has shown that the technology can be very popular in the future, and it is considered that high-tech is a prospective growth industry in the future (Hackl, 2021). The results of the questionnaire above present that persons who enjoy e-sports think that metaverse and NFT are very interesting and valuable industries. Although the above items were not directly linked to e-sports viewing behaviour through this study, it was clear that they are very interested in the two moderating variables. It is evaluated that there is an expectation that the e-sports market will be able to develop by accommodating the two industries that viewers are interested in as a current trend.

7.4 Limitations and Future Research Directions

The first limitation is conducting the survey only in one country. Korea is well known as a powerhouse of e-sports, and many people enjoy and watch games. For these reasons, the questionnaire was conducted in South Korea, where there are various demographic groups watching e-sports. It may be more accurate in countries with more people aware of the metaverse and NFT, but there is a possibility that the possession of the population watching e-sports in those countries is smaller than in other countries. Therefore, it is hard to rule out the possibility that different results may have been obtained if people from several countries were surveyed. Second, it was obvious that not many people understood it in detail because the metaverse and NFTs are still in the growth stage due to the characteristics of the industries. Even if respondents were either fans or experienced watching e-sports at least once, it is unfortunate that many people still have fewer experiences of playing metaverse-based games or trading NFTs than on other popular platforms. Although the definition and the short explanation of the terms were written in the questionnaire, there were not enough methods and time to deliver and inform what these elements were in detail.

Therefore, for future research, it would be appropriate to proceed when the industries such as metaverse and NFT have entered the maturity stage in terms of the industry life cycle and are recognised by more people. In addition, it seems that it would be more accurate to conduct research at a time when metaverse and NFTs are used widely as services to e-sports viewers. Also, even though the games based on metaverse technology have been released, the world e-sports market using NFTs is not well promoted at the moment. As a result, it is evaluated that it is right to conduct research when the service is provided favourably. Many people can use the service, so receiving sufficient feedback would be available.

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