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THE EFFECT OF VISUAL APPEAL, SOCIAL INTERACTION, ENJOYMENT, AND COMPETITION ON MOBILE ESPORTS ACCEPTANCE BY URBAN CITIZENS

Nufri Wilis	Computer Science Graduate Program, University of Nusa Mandiri, Jakarta, Indonesia	14002443@nusamandiri.ac.id
Lindung Parningotan Manik*	Research Center for Data and Information Sciences, National Research and Innovation Agency, Bandung, Indonesia	lind008@brin.go.id

* Corresponding author

ABSTRACT

Aim/Purpose	This study investigated a model of mobile esports acceptance among urban citizens based on an extended Technology Acceptance Model (TAM).
Background	Currently, esports are increasingly popular and in demand by the public. Supported by the widespread development of mobile devices, it has become an interactive market trend to play games in a new model, mobile esports.
Methodology	This study collected data from 400 respondents and analyzed it using partial least squares-structural equation modeling (PLS-SEM).
Contribution	This study addresses two research gaps. The first gap is limited esports information systems studies, particularly in mobile esports acceptance studies. The second gap is limited exploration of external variables in online gaming acceptance studies. Thus, this study proposed a TAM extended model by integrating the TAM native variables with other external variables such as visual appeal, enjoyment, social interaction, and competition to explore mobile esports acceptance by urban citizens.
Findings	Nine hypotheses were accepted, and four were rejected. The visual appeal did not affect the acceptance. Meanwhile, social interaction and enjoyment significantly affected both perceived ease of use and usefulness. However, perceived ease of use surprisingly had an insignificant effect on attitude toward using

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mobile esports. Moreover, competition significantly affected the acceptance, particularly on perceived usefulness.

Recommendations for Practitioners: Fresh and innovative features, such as new game items or themes, should be frequently introduced to enhance players' continued enjoyment. Moreover, mobile esports providers should offer a solid platform to excite players' interactions to increase the likelihood that users feel content. On the other hand, the national sports ministry/agency or responsible authorities should organize many esports competitions, big or small, to search for new talents.

Recommendations for Researchers: Visual appeal in this study did not influence the perceived ease of use or usefulness. However, it could affect enjoyment. Thus, it would be worth revisiting the relationship between visual appeal and enjoyment. At the same time, perceived ease of use is a strong driver for the continued use of most online games, but not in this study. It could indicate significant differences between mobile esports and typical online games, one of which is the different purposes. Users might play online games for recreational intention, but players would use mobile esports to compete, win, or even get monetary rewards. Therefore, although users might find mobile esports challenging and hard to use, they tend to keep playing it. Thus, monetary rewards could be considered a determinant of the continuation of use.

Impact on Society: Nowadays, users are being paid for playing games. It also would be an excellent job if they become professional esports athletes. This study investigated factors that could affect the continued use of mobile esports. Like other jobs, playing games professionally in the long term could make the players tedious and tired. Therefore, responsible parties, like mobile esports providers or governments, could use the recommendations of this study to promote positive behavior among the players. They will not feel like working and still consider playing mobile esports a hobby if they happily do the job. In the long run, the players could also make a nation's society proud if they can be a champion in prestigious competitions.

Future Research: A larger sample size will be needed to generalize the results, such as for a nation. It is also preferable if the sample is randomized systematically. Future works should also investigate whether the same results are acquired in other mobile esports. Furthermore, to extend our knowledge and deepen our understanding of the variables that influence mobile esports adoption, the subsequent research could look at other mobile esports acceptability based on characteristics of system functionality and moderator effects. Finally, longitudinal data-collecting approaches are suggested for future studies since behavior can change over time.

Keywords: esports, technology acceptance model, mobile

INTRODUCTION

Technological developments have a direct impact on progress in the field of sports. On the other hand, playing video games is becoming one of the most popular recreational activities among children, adolescents, and adults (Bányai et al., 2019). With this, the relationship between the two creates a new history in the birth of a technology-based sport known as esports (electronic sports). It is a form of sport where electronic systems support the main aspects of this sport. Computers and human interfaces mediate the entry and exit of players and teams from the esports system. In more

practical terms, esports is usually coordinated by different leagues or tournaments where players are often members of teams or organizations. In recent years, esports has become one of the fastest-growing forms of new media, driven by the growth of (online) gaming and streaming technologies (Hamari & Sjöblom, 2017).

Esports and video gaming may appear the same, but they are not. While gaming refers to playing any video game on any platform or by any means, esports is a competitive (professional and amateur) form of gaming (Chan et al., 2022). There is more at stake in esports than just pride: major esports tournaments now have a prize worth millions of dollars, not to mention potential sponsorship opportunities by various commercial/business organizations. However, (mobile) esports are naturally challenging to master and require a high level of skill to play. Most esports players are, by definition, gamers; however, this is not a prerequisite. While anyone with a (mobile) device can be a gamer, only those with exceptional skill in specific games will be able to compete in esports.

Furthermore, esports are different from traditional sports. Conventional sports, like ball-based games, are easier to play and watch. Traditional competition, like soccer, basketball, tennis, rugby, cricket, or golf, is around controlling a ball's movement, whether it is kicked, thrown, picked up, ran with, or passed. To play and watch the games are plain and simple. Players can easily follow along and keep up with the one point of focus: the ball. However, esports is far more complex than ball games (Jenny et al., 2017; D. Lee & Schoenstedt, 2011). Playing and watching (mobile) esports is not easy because there is no single dominant object of focus. Instead, in-game activity determines the visual appeal of esports. It might be one of the reasons why the broadcasting media of traditional sports and esports are different. While conventional sports work well on television, esports is mainly broadcasted digitally. It is unlikely to appeal to large television viewers as ball sports do.

Nevertheless, esports and traditional sports have some kind similarities in different ways. Esports, like conventional sports, has evolved among various social groups and increased social interaction through its inclusive gaming culture (Hamari & Sjöblom, 2017). Players also have the same kinds of enjoyment when playing esports and traditional sports, although in peculiar ways, one virtually and the other physically (Hamari & Sjöblom, 2017). Furthermore, esports, like conventional sports, has received a lot of attention for its competitive activities, such as highly rewarded tournaments and sponsored games (Mendoza et al., 2021).

This study investigated the influences of visual appeal, social interaction, enjoyment, and competition, specifically on mobile esports acceptance considering its similarities and differences with gaming and traditional sports. Therefore, this study could apply to broader populations, including esports industries, government, and citizens. For industries, the study could help the games' creator and the ecosystem to create a positive user experience in producing successful mobile esports. For the government, the study could help responsible authorities promote a positive environment to keep game providers and citizens as game players happy. Moreover, the players could also increase their skills, become professional athletes, and make a living from mobile esports.

Esports tournaments have been increasing lately. The esports were even included in the Southeast Asian (SEA) Games 2021 and Asian Games 2022 or perhaps will be included in the next Olympics. Sports are still considered a nation's unifier, and the athletes who become winners of big competitions are treated as national heroes. Some universities even provided esports athletes scholarships (Jenny et al., 2017). Furthermore, the nation's society would be proud if the athletes could win international competitions. Therefore, there is a need to look at the determinants that affect the users' acceptance of mobile esports, such as Mobile Legends, so that users can continue to play the game and be a tournament in leagues nationally and internationally.

The rest of the paper is organized as follows. In the second section, we present a literature review of recent publications related to the research topic. After that, the theoretical foundation and hypothesis development are explained in the following section. Furthermore, the research method, data results, and discussion are presented in subsequent sections. Then, theoretical and practical implications are

discussed in the consecutive section. Finally, the conclusion, limitations, and future works are given in the latter sections.

LITERATURE REVIEW

As esports are growing in popularity, some surpass people watching traditional sports and provide opportunities to study esports systems and other subjects on a large scale. Therefore, studies and research on esports are also growing. Table 1 describes the contribution of research on esports between 2002 and 2018 from several fields of science (Reitman et al., 2020). Furthermore, the overall development of smartphones has made an interactive market trend in playing online games in a new model, mobile esports. One of the most prominent applications in Google Playstore or Apple App store is the esports application (Atalay & Topuz, 2018).

Table 1. Studies of esports between 2002 and 2018

Discipline	Total Publications	Percentage of Corpus
Media studies	37	24.7
Informatics	30	20.0
Business	26	17.3
Sports science	20	13.3
Sociology	15	10
Law	12	8
Cognitive science	10	6.7

Esports research in informatics ranges from data mining, human-computer interactions, and information systems, including users' motivation to watch and participate in esports competitions (Chiu et al., 2021). Scholars in the field of informatics have collected data from a broad range of sources, including text mining (Olshefski, 2015), generated play data, and game telemetry (El-Nasr et al., 2013), and combined them with observations to study players' interaction, in-game performance, and team dynamics. In addition, the technology-mediated nature of esports allows researchers to collect vast volumes of data at multiple levels of analysis. For example, Low-Kam et al. (2013) constructed machine-learning algorithms to detect unexpected strategies from thousands of match replays to model player behavior.

Theory-driven research promotes a greater understanding of the attitudes and behaviors that affect a specific action. Even though studies on acceptance analysis of online (mobile) games are easy to find, research in investigating esports based on established theories performed in previous studies is limited. For example, a recent study by P.-K. Chung et al. (2022) investigated Hong Kong students' esports participation intentions using the theory of planned behavior (TPB). The results showed that all native TPB variables, such as attitude, subjective norm, and perceived behavioral control, significantly influence behavioral intention. Furthermore, Jang et al. (2021) developed a new framework, namely, the esports consumption (ESC) model, which was based on the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2). Three native UTAUT2 variables, such as hedonic motivation, habit, and social influence, significantly affected esports gameplay intention for both low and high-frequency gameplay groups.

This study addresses two research gaps. The first gap is limited esports information systems (IS) studies, particularly in mobile esports acceptance studies. The second gap is limited exploration of external variables in online gaming acceptance studies. Most acceptance studies used Technology Acceptance Model native variables such as perceived ease of use, perceived usefulness, attitude,

intention to use, and actual use. However, limited studies explored the other external variables. The chosen variables are based on the factors corresponding to similarities and differences between mobile esports and video games, as well as conventional sports. Therefore, this study investigated external variables such as visual appeal, social interaction, enjoyment, and competition.

THEORETICAL FOUNDATION AND HYPOTHESES DEVELOPMENT

Researchers have developed several models to determine users' acceptance of technology and information systems, including online gaming, one of which is the Technology Acceptance Model (TAM). The TAM was first developed by Davis (1989), who adapted the TRA (Theory of Reasoned Action) model. For example, the technology acceptance model (TAM) was adopted by Zhu et al. (2012) to evaluate user attitudes and intentions toward using online games. Two native TAM variables, such as perceived ease of use and perceived usefulness, positively affected user attitude toward user intention to use. Moreover, a previous study by Jap (2017) adapted the TAM to understand how online games are accepted in Indonesia. The results of the study confirm the relevance of constructs that have been proven by previous research: perceptions of ease of use, perceptions of usefulness, and intentions in the context of online games in Indonesia. However, the generalizability of these findings was unknown, so further study is needed. A summary of TAM studies on online games acceptance is shown in Table 2.

Table 2. Summary of TAM studies in online (video) games acceptance

Variable	(Zhu et al., 2012)	(Kim et al., 2013)	(Pando-Garcia et al., 2016)	(Jap, 2017)	(Sukendro et al., 2020)	(Dewi & Natalia, 2021)
Perceived ease of use	✓	✓	✓	✓	✓	✓
Perceived usefulness	✓	✓	✓	✓	✓	✓
Social influence						✓
Personal						✓
Excitement						✓
Facilitating conditions					✓	
System quality	✓					
Information quality	✓					
Service-provider characteristics	✓					
Flow experience		✓				
Accessibility		✓				
Attitude	✓	✓	✓		✓	✓
Intention to use	✓	✓	✓	✓	✓	✓
Actual use				✓	✓	✓

TECHNOLOGY ACCEPTANCE MODEL

TAM was first introduced by Davis (1989). Several scientists subsequently redeveloped it (e.g., Adams et al., 1992; Igbaria & Iivari, 1995; Szajna, 1994; Venkatesh et al., 2003). As stated by Davis (1989), the main goal of TAM is to explain the factors that influence the acceptance of technology by a wide

range of users. According to TAM, the acceptance level of technology is determined by six factors, namely external variables, user perceptions of the ease of using the technology (perceived ease of use), user perceptions of the usefulness of the technology (perceived usefulness), user attitudes toward use the technology (attitude toward using), behavioral intention to use, and actual system use. External variables influence perceived ease of use and perceived usefulness. Meanwhile, two later variables positively affect attitude toward using the technology, and the latest influences behavioral intention to use. Furthermore, attitude affects the intention to use the technology, and the intention influences actual system use. TAM was utilized in this study because it is a powerful and robust prediction model for understanding user adoption of technology in numerous contexts, according to a meta-analysis of 88 studies in various areas (King & He, 2006).

Visual appeal

A user interface's visual appeal reflects its appearance, feel, and perceived beauty in the online environment (Montoya-Weiss et al., 2003). The visual appearance's initial impact on consumers is vital for a positive value experience (Mathwick et al., 2001). In other words, a website's attractiveness is implied by its aesthetic appeal, which includes its graphics and color scheme (Loiacono et al., 2007). According to an e-retailing study by Wang et al. (2011), having a beautiful website that helps customers enjoy their online shopping experience is crucial. The same behavior that applies to internet browsing can also be reflected in esports, played online on users' PCs or mobile devices. An object's aesthetic design and physical attractiveness typically provide visual appeal. It is pertinent to esports because players are interested in the appearance of the objects they see in the games. The more players are drawn to esports and level of enjoyment increases as the graphic display level rises. Visual appeal is a decisive factor in the pleasure users feel during interactions, according to research on the aesthetics of computer interfaces by Merhi (2016).

Social interaction

The availability of playing, challenging, and chatting with players worldwide boosts the desire for mobile esports. People who use the internet for social stimulation find online gaming particularly appealing due to these opportunities (Lo et al., 2005). Online games are also the primary means users communicate instantaneously and anonymously, exchange experiences, socialize, and ultimately create virtual communities (Ang et al., 2007). According to a study by Martey and Stromer-Galley (2007), the key motivator for ongoing play is social opportunities based on the players' experiences in the game. Through mobile esports, users can create groups and teams to compete against others or make online acquaintances. Some people find it difficult to make friends in person and instead choose to use the internet to meet their needs. The main objective of internet connectivity has been recognized as meeting unmet social needs in the actual world. Therefore, the adoption of online games may be influenced by users' social interactions while playing (Merhi, 2016).

Enjoyment

The key to enjoyment is appreciating the experience for what it is, independent of any potential adverse effects (Holbrook, 1994). As an intrinsic motivator, enjoyment strongly foretells a range of IT breakthroughs. This construct was first included in the TAM by van der Heijden et al. (2003), and both the IS literature and online game studies have made important use of it. For instance, a study on the adoption of mobile games by Ha et al. (2007) claimed that the game's perceived enjoyment should be a core component. In their research, they discovered that enjoyment positively impacts user adoption. A study by Deci and Ryan (1985) demonstrated that people are more likely to continue a behavior in the future when it is motivated by intrinsic motivations like interest and pleasure. Moreover, a study by Wu and Liu (2007) found that enjoyment consistently and robustly predicted behavioral intention to play online games. Players who are satisfied with their gaming experience are more likely to support mobile esports (and games in general). Therefore, they are more likely to adopt and use it continuously (Merhi, 2016; Merikivi et al., 2017).

Competition

The variable is used to explore players' competitiveness. Players typically desire to win games and engage in behaviors that contribute to winning. They often describe themselves as competitive and confident in their abilities. There was a positive correlation between the competitor dimensions typology and self-descriptive competitiveness adjectives (Kahn et al., 2015). One of the best indicators of a player's progress in a game is whether they are motivated by competition. For example, the challenge to outrank other players provokes players' motivation to continue to play the games. Challenge was found to significantly influence perceived enjoyment toward continuation intention (Merikivi et al., 2017).

Research Model and Hypotheses

Figure 1 shows the proposed extended TAM in this study with a total of nine variables.

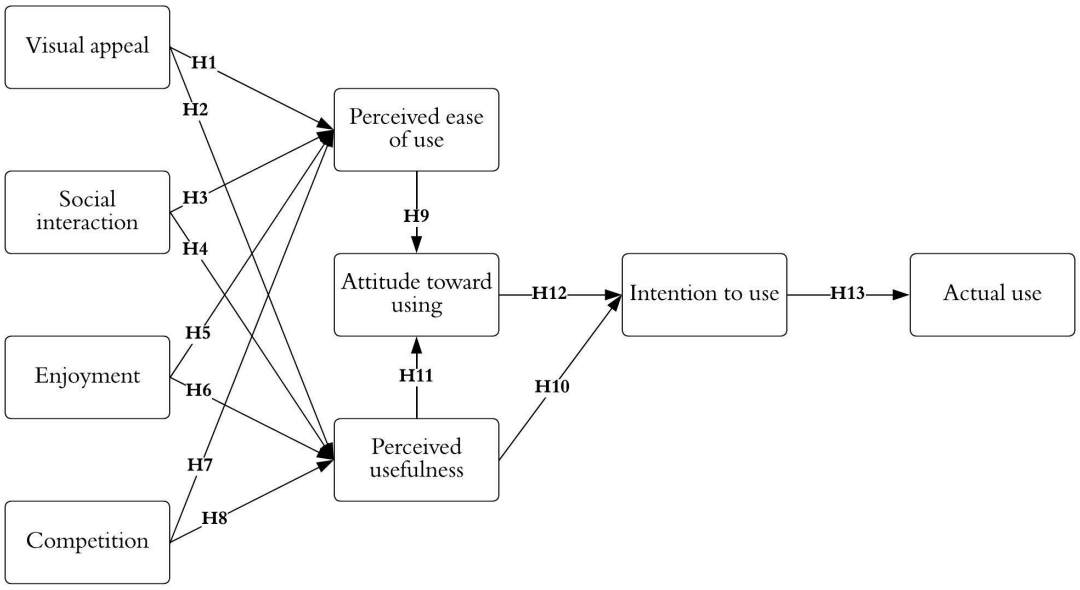

Figure 1. Research model

A study by Pengnate and Sarathy (2017) revealed that perceived website visual appeal, which refers to the visual aesthetic impression of the website, had an effect on two native TAM variables, perceived ease of use and usefulness. Instead of being deemed just ornamental in the context of unfamiliar websites, visual appeal conveyed performance, particularly the vendor's quality, and ability to deliver products or services to the client. Therefore, visual appeal was proposed in this study and expected to influence the perceived ease of use and perceived usefulness positively.

H1: Visual appeal (VA) influences perceived ease of use (PEOU)

H2: Visual appeal (VA) influences perceived usefulness (PU)

Furthermore, social (human-to-human) interaction was found to influence both perceived ease of use and usefulness in understanding usage behaviors on animation, comics, and games (ACG) sites in a social media study by J.-H. Lee and Lee (2019). Interaction is defined as the technology used to send and receive information, which is believed that would ease users. Thus, social interaction was hypothesized to significantly influence perceived ease of use and usefulness in this study.

H3: Social interaction (SI) influences perceived ease of use (PEOU)

H4: Social interaction (SI) influences perceived usefulness (PU)

A recent study by To and Trinh (2021) found that enjoyment positively affected the perceived ease of use and usefulness of using mobile wallets in Vietnam. Furthermore, a study by Alalwan et al. (2018) revealed that perceived enjoyment significantly influenced the usefulness of mobile internet adoption in Saudi Arabia. Therefore, this study adopted the variable and was expected to positively affect perceived ease of use and perceived usefulness.

H5: Enjoyment (E) affects perceived ease of use (PEOU)

H6: Enjoyment (E) affects perceived usefulness (PU)

Competition variable is rarely investigated in TAM studies. Since this variable is one of the mobile esports differentiators from the usual online mobile games, the competition was included in the research model of this study. A study by J. B. Chung and Kim (2009) found that perceived competition among the candidate cities significantly affected a local citizen's acceptance of a facility. Thus, this study proposed this variable as a significant factor affecting the acceptance of mobile esports. In particular, the competition was expected to influence perceived ease of use and easefulness significantly.

H7: Competition (C) affects perceived ease of use (PEOU)

H8: Competition (C) affects perceived usefulness (PU)

According to TAM, one of its native variables, perceived ease of use, influences the attitude toward behavior. Therefore, this variable was used as a factor in the proposed model based on prior studies (Dewi & Natalia, 2021; Sukendro et al., 2020; Zhu et al., 2012). This factor represents the users' opinion regarding the ease of using mobile esports in this study. In particular, perceived ease of use was expected to positively affect the users' attitudes. Furthermore, another factor in the proposed model, based on TAM, was perceived usefulness. Perceived usefulness was one of the determinant variables of intention to use among players according previous studies (Dewi & Natalia, 2021; Kim et al., 2013; Pando-Garcia et al., 2016; Zhu et al., 2012). Furthermore, as again shown by Chauhan et al. (2021), the analytics showed that perceived usefulness was a major factor in behavior intention in the online mobile gaming industry. This study used this native TAM variable to indicate that using mobile esports could benefit its users. Therefore, perceived usefulness was believed to impact users' attitudes and intentions to use positively.

H9: Perceived ease of use (PEOU) affects attitude toward using (ATU)

H10: Perceived usefulness (PU) influences intention to use (ITU)

H11: Perceived usefulness (PU) affects attitude toward using (ATU)

Most TAM studies (Dewi & Natalia, 2021; Kim et al., 2013; Pando-Garcia et al., 2016; Sukendro et al., 2020; Zhu et al., 2012) showed that attitudes toward using the technology influenced users' intention to use the technology. Also, most TAM studies (Dewi & Natalia, 2021; Jap, 2017; Sukendro et al., 2020) showed that the intention affected the actual use. Thus, attitude toward using mobile esports was hypothesized to influence the intention to use significantly, and the intention was expected to positively affect the actual use of mobile esports.

H12: Attitude toward using (ATU) influences intention to use (ITU)

H13: Intention to use (ITU) influences actual usage (AU)

METHODOLOGY

A set of questionnaires was used as the instrument of this research. It was designed according to the research model presented in Figure 1. The questionnaires were divided into two sections. The first section contained questions about the respondents' profile and their experience as well as habits of playing Mobile Legends: Bang Bang (MLBB). The second section contained statements with a five-point Likert scale ranging from one to five, where 1 indicated 'strongly disagree', 2 indicated 'disagree', 3 indicated 'neutral', 4 indicated 'agree', and 5 indicated 'strongly agree'. In order to measure

the constructs, 32 scale items were adopted from cited literature, which had been adjusted based on case studies.

Furthermore, structural equation modeling (SEM) analysis was performed to test the inner model. It determines the level of relationship between variables consisting of independent and dependent variables in a model. SEM is an extension or combination of a set of multivariate techniques that allows the simultaneous testing of a relatively complex set of relationships. For example, the model can determine a system that interacts as a series of path flows, where the flow describes the relationship between one variable and another variable.

SmartPLS 3 was used to analyze the collected data. While another software, like Amos, is one of the tools to conduct covariance-based SEM (CB-SEM), SmartPLS is used to perform SEM based on partial least squares (PLS). CB-SEM is used to test a theory, confirm a theory, or compare alternative theories. Meanwhile, this research was exploratory or extended an existing structural theory and predicted key driver constructs. Thus, a PLS-SEM-based tool, like SmartPLS, was suitable for this research. The stage of data analysis included the measurement model and structural model. While a measurement model measures latent or composite variables, a structural model evaluates all hypothetical relationships using path analysis.

SAMPLE

The sample size of this study was determined using the apriori approach by Westland (2010). Since SEM was used, the required size given the number of latent (unobserved) variables of 9, the number of observed (indicator) items of 32, the anticipated effect size of 0.3 (medium), the statistical power level of 0.95, and the probability level of 0.05, is 133 and 264 sample for model structure and detecting effects, respectively. Therefore, 264 samples are a minimum size for both performing SEM analysis and detecting any significant effects statistically.

The data collected in this study came from the distribution of online questionnaires using the purposive sampling method. It is a sampling method used to select subjects based on specific criteria, namely the people of an urban city of Indonesia, Jakarta, and its surroundings who are users of MLBB. Jakarta, with citizens of ten million people, was chosen as a study case because its infrastructures, like fast internet access, support mobile esports usage since it is the capital city of Indonesia.

MEASURE

The assessment of the goodness of fit criteria in partial least squares (PLS) was based on an assessment of the outer and inner models during the model measurement analysis stage. There were two measurement criteria to assess the outer model: validity tests, such as convergent validity, like factor loading and average variance extracted (AVE), and discriminant validity, and reliability tests, such as composite reliability and Cronbach's alpha.

The validity test is a test that assesses the instrument's level of validity. If the instrument used to collect the data is capable of measuring what needs to be measured, it is valid. Therefore, a valid questionnaire is one that is suitable for measuring the constructs being measured. In other words, the validity test is carried out on an instrument's content, aiming to measure the instrument's accuracy (questionnaire) used in a study. Convergent validity can be seen from the correlation of the indicator with the construction value. For example, an indicator with a factor loading (outer loading) value is said to be valid if it has a correlation value above 0.7 (Vinzi et al., 2010).

Moreover, the ability of the latent variable value to represent the original data score can be determined by examining the AVE value, which can be used to evaluate construct validity. The higher the ability to explain the value of the indicators that measure the latent variable, the higher the AVE score. The AVE value indicates a measure of convergent validity where the probability of an

indicator in a construct entering another variable is minimized if the AVE value is higher than 0.50 (Hair et al., 2019).

Besides convergent validity, discriminant validity was also used to measure the validity level of the construct items. It is the extent to which a construct is different from other constructs, whether the indicators of a construct are not highly correlated with indicators from other constructs. Based on cross-loading measurements of constructs, the discriminant validity of the measurement model with reflecting indicators was evaluated. Suppose the correlation between the construct and the measurement item is more important than the size of the other constructs. In that situation, the latent construct outperforms alternative block sizes at predicting block size. Cross-loading value in each indicator on a variable in the construct should be higher than 0.7 as a condition for fulfilling discriminant validity (Hair et al., 2019).

Discriminant validity was also tested with another method by applying the Fornell-Larcker criteria (Fornell & Larcker, 1981), which compared the correlation value between each construct and other constructs to the square root value of each construct's AVE (latent variable correlation). If the AVE root for each construct is higher than the correlation between the constructs and other constructs, the model has sufficient discriminant validity. Similar to cross-loading, each indicator on a variable in the construct should be higher than 0.7 as a condition for fulfilling discriminant validity based on Fornell-Larcker. Nevertheless, the Fornell-Larcker discriminant validity test is subjected to several criticisms (Henseler et al., 2015), thus the heterotrait-monotrait ratio of correlations (HTMT) test was performed. If the HTMT score is less than 0.90, discriminant validity between two reflective constructs has been established.

Meanwhile, the reliability test measures the reliability level of a variable or construct indicator. For instance, when a respondent consistently answers a statement on a questionnaire, it is reliable. Cronbach's alpha is a measure of internal consistency, or how closely linked a group of items is. It is regarded as a scale reliability metric. Similar to Cronbach's alpha, composite reliability, also known as construct reliability, (CR) is a measure of internal consistency in scale components. The AVE coefficient reflects the variance in indicators that may be explained by common factors. Variables and indicators are considered reliable if the values of CR and Cronbach's alpha coefficient are higher than 0.7 (Nunnally, 1978).

Since the research model included several dependent and independent variables, the collinearity test needed to be performed, according to Hair et al. (2019). Collinearity denotes that two variables are almost perfect linear combinations of one another. Variance inflation factors (VIF) measure the inflation in the variances of parameter estimations caused by collinearities between predictors. A VIF of 1 indicates no correlation between a predictor and the remaining predictor variables. VIFs more than 4 need additional examination, whereas VIFs greater than 10 indicate substantial multicollinearity that must be corrected.

In cross-sectional studies, such research is prone to common method bias (CMB). It refers to a bias in the data, which may cause common method variance resulting in an inflated relationship between variables. It could be caused by something other than the measurements, which come from self-reported bias when data are collected from a common source or when predictors and dependent variables were measured using the same scale. Therefore, checking whether the measurements were free from CMB is necessary. For example, measured latent method factors could be added to the confirmatory factor analysis (CFA) model, allowing all self-reported items to load on their respective theoretical constructs and the method factor to measure and then partially out the potential CMB impact (Bagozzi, 2011). The Harman single-factor (one-factor) test is the most widely used technique for detecting CMB (Podsakoff et al., 2003). It determines if a single factor can explain the majority of the variance. In this method, all items from each construct are loaded into a factor analysis to see if a single factor accounts for the majority of the variance among the measures. If no single factor accounts for more than 50% of the variance, this indicates that CMB is not an issue in the study.

SPSS was used to perform this test. Moreover, VIF values less than 3.3 also suggest the absence of CMB (Kock, 2015).

Finding out the relationship of the independent variable to the dependent variable was executed by running the bootstrapping algorithm. The hypothesis test was performed by looking at the acquisition results of the original sample value and the value of t-statistics or p-value. A hypothesis is accepted, or the relationship between the independent and dependent variables is declared to have a significant effect if the p-value is lower than the predetermined level of 0.05 (5%) or the t-statistic value is higher than 1.96. Otherwise, if the p-value is higher than 0.05 or the t-statistic value is lower than 1.96, then the hypothesis is rejected. The lower the p-value, or the higher the t-statistic value, the higher the significant effect of the relationship between the two variables.

Furthermore, this research also measured R^2, Q^2, and f^2 as key model fit indices. R^2 explains the variance in the endogenous variable explained by the exogenous variable(s). Chin (1998) recommended R^2 values for endogenous latent variables as 0.67 (substantial), 0.33 (moderate), and 0.19 (weak). Furthermore, Q^2 is predictive relevance, which measures whether or not a model has predictive relevance. A Q^2 value large than 0 indicates that the model is well constructed. Meanwhile, f^2 is measured for estimating effect size in a multiple regression model with continuous dependent and independent variables. According to Cohen (1988), $f^2 >= 0.02$ is considered a small effect, $f^2 >= 0.15$ has a medium effect, and $f^2 >= 0.35$ is large.

DATA RESULTS

The respondents' demographic is shown in Table 3. Men dominated respondents' data based on gender. It consisted of 360 male respondents with a percentage of 90% and 40 female respondents with a percentage of 10%. Furthermore, respondents' data based on age was dominated by 19-25 years, based on occupation was dominated by university students, and most reside in Jakarta. The respondents' data was quite varied based on the usage period and frequency. As seen in the table, 40% of respondents seldom played MLBB, of which 35% spent less than an hour, and 51% played at least once a day, of which 40% spent 1-5 hours a day. The variety again could be seen in the respondents' addiction to the game. Almost half of the respondents have ever spent their money to buy characters/items, and almost another half have ever not.

MEASUREMENT MODEL

The measurement results for convergent validity, such as factor loading and AVE, are shown in Table 4. According to the validity criteria, all indicators and variables were declared valid because all factor loading values were higher than the predetermined level of 0.7 and AVE values were higher than 0.05. Meanwhile, results of discriminant validity based on cross-loading, Fornell-Larcker criteria, and HTMT test are presented in Tables 5, 6, and 7, respectively, where the highest value in each row is boldly printed. As seen in Table 5, all values of each variable item were above the predetermined level of 0.7, and item correlation had a higher value than the item's correlation to other items. Similar to cross-loading test results, as presented in Table 6, all Fornell-Larcker values of each variable item were above 0.7, and item correlation had a higher value than the item's correlation to other items. Furthermore, as seen in Table 7, all HTMT values were lower than the predetermined level of 0.9. Therefore, all variables were declared valid since the measurement results met the discriminant validity requirements.

Table 4 also shows the results of reliability tests, such as Cronbach's alpha (α) and composite reliability (CR). According to these results, all variables were declared reliable because all values were higher than the predetermined level of 0.7. Furthermore, the collinearity test results are shown in Table 8. All VIF values were lower than 4, showing that there is a minimum correlation between a predictor and the remaining predictor variables. Moreover, Table 9 shows the results of the Harman single-factor test to check whether the CMB was an issue for the data. According to the results of this test, a

single factor accounted for less than 50% of the variance. Furthermore, all VIF values less than 3.3 are also additional validation. Since the results of the Harman one-factor test and VIF values are lower than the predetermined level, this study can be deemed free of CMB.

Table 3. Respondents' demographics

Category	Description	Percentage
Gender	Male	90%
	Female	10%
Age	Less than 19 years old	11%
	19-25 years old	56%
	25-35 years old	31%
	Over 35 years old	2%
Job	High school student	9%
	University student	56%
	Employees/entrepreneurs	33%
	Other	2%
Domicile	Jakarta	85%
	Bogor	1%
	Depok	1%
	Tangerang	0%
	Bekasi	13%
How long have you been using MLBB?	Less than 1 year	17%
	1-2 years	28%
	2-3 years	18%
	3-5 years	23%
	More than 5 years	14%
How often do you use MLBB?	Seldom	40%
	Once a month	0%
	Once a week	9%
	Once a day	16%
	Several times a day	35%
How many hours do you spend using MLBB in one week?	Less than an hour	35%
	1-5 hours	40%
	5-10 hours	13%
	10-15 hours	4%
	15-20 hours	7%
Do you spend money to use MLBB, like buying characters or items?	Yes	56%
	No	44%

Table 4. Construct items, factor loading, AVE, Cronbach's alpha, and composite reliability

Con-struct	Indicator	Measure items	Factor loading	AVE	α	CR	Source
Visual appeal (VA)	VA1	MLBB is aesthetically appealing	0.923	0.820	0.882	0.925	(Merhi, 2016; Pengnate & Sarathy, 2017)
	VA2	I usually find MLBB's design visually appealing.	0.942				
	VA3	Regardless of the type of fun they offer, MLBB usually uses beautiful colors, graphics, and lay-outs.	0.823				
Social in-teraction (SI)	SI1	Playing MLBB allows me to make friends	0.934	0.878	0.930	0.950	(Chang, 2013; J.-H. Lee & Lee, 2019; J. Lee et al., 2019)
	SI2	I love meeting friends I made while playing MLBB	0.845				
	SI3	Communicating with others is useful for playing MLBB	0.944				
	SI4	Collaborating with others makes playing MLBB more fun	0.911				
Enjoy-ment (E)	E1	Playing MLBB is interesting for me	0.889	0.708	0.943	0.956	(Merikivi et al., 2017) (To & Trinh, 2021) (Alalwan et al., 2018)
	E2	It is fun to play MLBB	0.899				
	E3	MLBB is one of the most fun mobile esports I play	0.862				
	E4	MLBB is one of the most entertaining mobile esports I play	0.901				
Competi-tion (C)	C1	Playing MLBB challenges me	0.915	0.806	0.911	0.937	(Merikivi et al., 2017) (J. B. Chung & Kim, 2009)
	C2	Playing MLBB provides a good test for my play-ing skills	0.926				
	C3	Playing MLBB challenges me to do the best	0.926				
	C4	Playing MLBB expands my abilities to the limit	0.869				
	C5	Playing MLBB makes me think	0.872				
Perceived ease of use (PEOU)	PEOU1	MLBB is easy to play	0.809	0.820	0.795	0.879	(Dewi & Natalia, 2021)
	PEOU2	MLBB is easy to learn	0.882				
	PEOU3	It is easy for me to become proficient in playing MLBB	0.831				
Perceived useful-ness (PU)	PU1	Playing MLBB help me to improve my mobile esports skills	0.900	0.878	0.836	0.901	(Kim et al., 2013; Pando-Garcia et al., 2016)
	PU2	I like to spend my free time playing MLBB	0.857				
	PU3	MLBB is an efficient tool to practice	0.845				
Attitude toward use (ATU)	ATU1	I responded positively about the existence of MLBB	0.924	0.814	0.930	0.956	(Dewi & Natalia, 2021)
	ATU2	I like playing MLBB	0.971				
	ATU3	I think playing MLBB is a good idea	0.916				
Intention to use (ITU)	ITU1	I will continue to play MLBB	0.939	0.788	0.863	0.916	(Dewi & Natalia, 2021)
	ITU2	I intend to play MLBB	0.877				
	ITU3	I will be playing MLBB for a long time	0.839				
Actual use (AU)	AU1	Playing MLBB is a solution for me to get rid of boredom	0.852	0.785	0.926	0.948	(Dewi & Natalia, 2021; Kim et al., 2013)
	AU2	I love playing MLBB	0.959				
	AU3	I like the service provided by MLBB	0.863				
	AU4	I am satisfied playing MLBB	0.944				

Table 5. Cross loading discriminant validity test results

Item	VA	SI	E	C	PEOU	PU	ATU	ITU	AU
VA1	**0.923**	0.628	0.641	0.401	0.415	0.505	0.603	0.516	0.662
VA2	**0.942**	0.540	0.722	0.445	0.347	0.501	0.570	0.484	0.727
VA3	**0.823**	0.417	0.554	0.324	0.284	0.273	0.405	0.237	0.541
SI1	0.550	**0.934**	0.498	0.647	0.345	0.575	0.527	0.472	0.517
SI2	0.542	**0.845**	0.587	0.534	0.402	0.517	0.579	0.512	0.507
SI3	0.526	**0.944**	0.508	0.687	0.513	0.626	0.585	0.471	0.406
SI4	0.578	**0.911**	0.549	0.720	0.348	0.589	0.562	0.480	0.518
E1	0.605	0.503	**0.889**	0.412	0.503	0.594	0.629	0.690	0.784
E2	0.620	0.532	**0.899**	0.456	0.458	0.563	0.617	0.662	0.832
E3	0.676	0.559	**0.862**	0.444	0.515	0.544	0.634	0.532	0.728
E4	0.648	0.485	**0.901**	0.365	0.379	0.567	0.706	0.594	0.755
C1	0.364	0.658	0.390	**0.915**	0.346	0.565	0.506	0.376	0.335
C2	0.504	0.671	0.486	**0.926**	0.371	0.558	0.563	0.420	0.529
C3	0.357	0.616	0.394	**0.926**	0.398	0.534	0.566	0.294	0.376
C4	0.372	0.621	0.472	**0.869**	0.389	0.487	0.476	0.362	0.447
C5	0.385	0.657	0.392	**0.872**	0.224	0.529	0.606	0.341	0.315
PEOU1	0.361	0.279	0.471	0.192	**0.809**	0.445	0.274	0.345	0.282
PEOU2	0.420	0.372	0.477	0.342	**0.882**	0.611	0.484	0.422	0.359
PEOU3	0.219	0.463	0.385	0.419	**0.831**	0.564	0.411	0.442	0.355
PU1	0.432	0.620	0.514	0.521	0.553	**0.900**	0.710	0.649	0.390
PU2	0.457	0.519	0.668	0.560	0.624	**0.857**	0.731	0.629	0.577
PU3	0.394	0.514	0.468	0.454	0.506	**0.845**	0.599	0.581	0.343
ATU1	0.641	0.664	0.597	0.594	0.398	0.751	**0.924**	0.626	0.522
ATU2	0.580	0.585	0.729	0.567	0.440	0.739	**0.971**	0.684	0.628
ATU3	0.468	0.495	0.716	0.528	0.494	0.725	**0.916**	0.707	0.606
ITU1	0.470	0.537	0.630	0.387	0.471	0.691	0.669	**0.939**	0.522
ITU2	0.491	0.477	0.651	0.394	0.476	0.663	0.695	**0.877**	0.632
ITU3	0.297	0.381	0.569	0.256	0.311	0.529	0.522	**0.839**	0.443
AU1	0.476	0.444	0.716	0.372	0.328	0.428	0.534	0.492	**0.852**
AU2	0.709	0.485	0.836	0.402	0.406	0.471	0.600	0.590	**0.959**
AU3	0.666	0.389	0.763	0.297	0.240	0.378	0.496	0.516	**0.863**
AU4	0.751	0.590	0.841	0.527	0.449	0.556	0.626	0.600	**0.944**

Table 6. Fornell-Larcker discriminant validity test results

Construct	VA	SI	E	C	PEOU	PU	ATU	ITU	AU
VA	**0.898**								
SI	0.602	**0.910**							
E	0.718	0.586	**0.888**						
C	0.440	0.714	0.473	**0.902**					
PEOU	0.396	0.447	0.525	0.387	**0.841**				
PU	0.495	0.636	0.639	0.593	0.650	**0.868**			
ATU	0.600	0.620	0.727	0.601	0.474	0.788	**0.937**		
ITU	0.484	0.530	0.699	0.398	0.483	0.716	0.718	**0.886**	
AU	0.725	0.530	0.873	0.446	0.398	0.510	0.625	0.610	**0.906**

Table 7. HTMT discriminant validity test results

Construct	VA	SI	E	C	PEOU	PU	ATU	ITU
SI	**0.651**							
E	**0.794**	0.639						
C	0.475	**0.761**	0.510					
PEOU	0.462	0.507	**0.616**	0.432				
PU	0.550	0.718	0.725	0.664	**0.784**			
ATU	0.647	0.667	0.791	0.644	0.538	**0.888**		
ITU	0.515	0.588	0.783	0.432	0.567	**0.832**	0.791	
AU	0.785	0.574	**0.849**	0.471	0.454	0.569	0.671	0.670

Table 8. Values of VIF

Construct	PEOU	PU	ATU	ITU	AU
VA	2.303	2.303			
SI	2.644	2.644			
E	2.258	2.258			
C	2.061	2.061			
PEOU			1.732		
PU			1.732	2.636	
ATU				2.636	
ITU					1.000

Table 9. Harman single-factor test results

s	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	16.203	49.099	49.099	15.648	47.419	47.419
2	2,828	8,570	57,669			
3	2,028	6,145	63,814			
4	1,585	4,802	68,616			
5	1,272	3,855	72,471			

Structural Model

The results of the structural model analysis are shown in Figure 2, and the hypothesis test results are presented in Table 10. Of the total 13 hypotheses tested, nine were accepted since the relationships between two variables in the hypothesis showed a significant correlation where the t-statistic value is higher than 1.96, and four were rejected because the p-value is higher than the predetermined level of 0.05. Moreover, values of R^2 and Q^2 are presented in Table 11. Based on the results, all R^2 values were higher than 0.33, which was a moderate value. Also, all Q^2 values were higher than 0, indicating that the model had predictive relevance. Furthermore, values of f^2 are shown in Table 12. The effect estimations were in line with path analysis results.

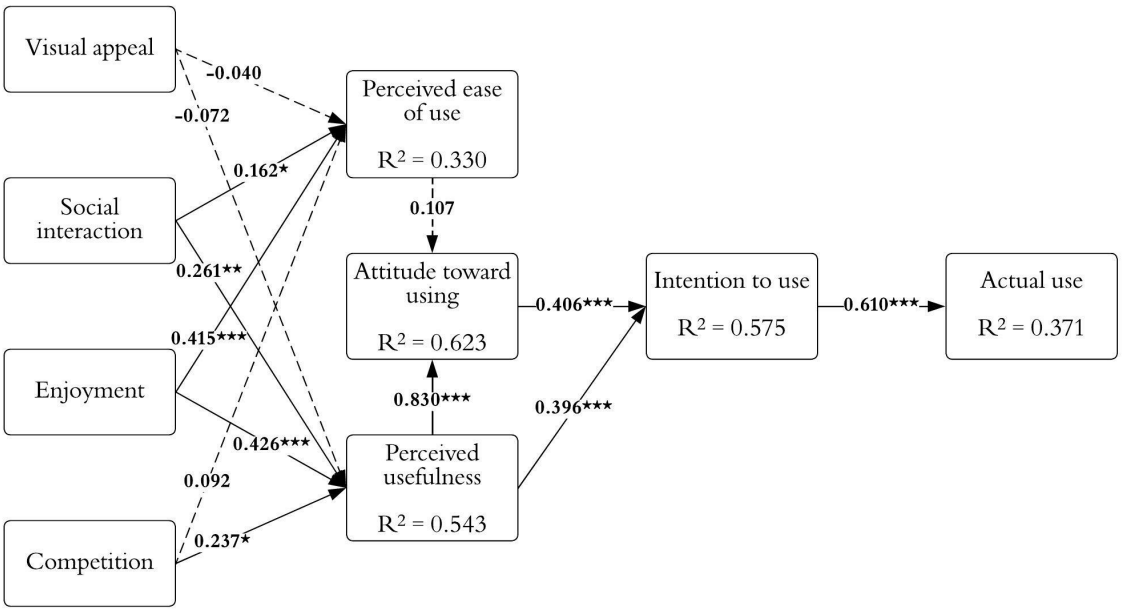

Figure 2. Results of PLS-SEM path analysis (*p<0.05, **p<0.01, ***p<0.001)

Table 10. Hypothesis testing results

Hypothesis	Coefficient (β)	T Statistics (|β/STDEV|)	P-value	Result
H1: VA → PEOU	-0.040	0.434	0.332	Rejected
H2: VA → PU	-0.072	1.127	0.130	Rejected
H3: SI → PEOU	0.162	1.655	0.049	Accepted
H4: SI → PU	0.261	2.378	0.009	Accepted
H5: E → PEOU	0.415	3.484	0.000	Accepted
H6: E → PU	0.426	5.733	0.000	Accepted
H7: C → PEOU	0.092	0.898	0.185	Rejected
H8: C → PU	0.237	1.755	0.040	Accepted
H9: PEOU → ATU	-0.066	1.245	0.107	Rejected
H10: PU → ITU	0.396	6.103	0.000	Accepted
H11: PU → ATU	0.830	17.978	0.000	Accepted
H12: ATU → ITU	0.406	7.298	0.000	Accepted
H13: ITU → AU	0.610	15.625	0.000	Accepted

Table 11. Values of R^2 and Q^2

Variable	R^2	Q^2
PEOU	0.330	0.207
PU	0.543	0.389
ATU	0.623	0.542
ITU	0.575	0.433
AU	0.371	0.301

Table 12. Values of f^2

Construct	PEOU	PU	ATU	ITU	AU
VA	0.001	0.005			
SI	0.014	0.056			
E	0.111	0.176			
C	0.006	0.060			
PEOU			0.007		
PU			1.057	0.140	
ATU				0.147	
ITU					0.591

Visual appeal insignificantly influenced perceived ease of use (β=-0.040, p=0.332, f^2=0.001) and perceived usefulness (β=-0.072, p=0.130, f^2=0.005). Furthermore, social interaction positively affected perceived ease of use (β=0.162, p=0.049, f^2=0.014) and perceived usefulness (β=0.261, p=0.009, f^2=0.056). Enjoyment significantly influenced both perceived ease of use (β=0.415, p=0.000, f^2=0.111) and perceived usefulness (β=0.426, p=0.000, f^2=0.176). Moreover, competition insignificantly influenced perceived ease of use (β=0.092, p=0.185, f^2=0.006) but positively affected perceived usefulness (β=0.237, p=0.040, f^2=0.060). Meanwhile, perceived ease of use insignificantly influenced attitude toward use (β=-0.066, p=0.107, f^2=0.007). However, perceived usefulness significantly affected attitudes toward use (β=0.830, p=0.000 f^2=1.057) and intention to use (β=0.396, p=0.000, f^2=0.140). Lastly, there was a significant influence between attitude toward use and the intention to use (β=0.406, p=0.000, f^2=0.147), also intention to use and actual use (β=0.610, p=0.000, f^2=0.591).

DISCUSSION

Technologies' aesthetic design and physical attractiveness determine their visual appeal. Typically, users are more attracted to technology with a high visual quality appearance (Merhi, 2016). However, it might vary depending on the case, the object under study, and the target population (Indarsin & Ali, 2017). The results of this study do not corroborate with a study by Pengnate and Sarathy (2017). MLBB has undergone many visual updates. However, with 22 seasons passed, players must constantly be updated about this game, including its appearances, game controls, and features. Therefore, the current visual might be considered less familiar to players who rarely play this game or are new to playing. Furthermore, the MLBB controls could be considered too many. Therefore, some buttons might be rarely used and sometimes inconvenient. These possible reasons could make the visual appeal not affect mobile esports' ease of use and usefulness.

Social interaction positively affected perceived ease of use and usefulness with a low effect. Users might view mobile esports as a fun chance to interact with others. Regardless of the effect, this result is in line with J.-H. Lee and Lee (2019). Furthermore, as discussed in previous studies (Ang et al., 2007; Lo et al., 2005; Martey & Stromer-Galley, 2007; Merhi, 2016), users might also have the chance to play while conversing with others online, establishing a community for playing and training together. For instance, one of esports' features is that it allows direct communication with teammates and opponents. Hence, these interactions could make mobile esports easy to use and valuable.

The finding of a significant influence of enjoyment on both perceived ease of use and usefulness with a strong effect corroborates with studies by Alalwan et al. (2018) and To and Trinh (2021). It implied that users who were excited about mobile esports could play them easily. Also, in line with previous studies, enjoyment was found as a significant factor in continual online game usage (Ha et al., 2007; Kahn et al., 2015; Merhi, 2016; Merikivi et al., 2017; Wu & Liu, 2007). In addition, users enjoying mobile esports could evoke positive feelings, and the games would become helpful to make the players happy. Therefore, enjoyment has a significant relationship with mobile esports' ease of use and usefulness.

The effect of competition on mobile esports acceptance is partially aligned with a study by J. B. Chung and Kim (2009). One possible reason for the insignificant effect of competition on perceived ease of use might be caused by the users' limitations created by some esports competition rules. For example, players cannot choose the character they want during the competition. However, users prefer to participate in playing mobile esports not just for enjoyment but also because it may be utilized to fulfill their other needs, such as to compete, satisfy desires, and feel a sense of accomplishment. Even if these achievements are intangible, the players may value them highly (Merhi, 2016). Hence, there was a correlation between the competition and the usefulness of mobile esports, although the effect was small.

Furthermore, the insignificant effect of perceived ease of use on attitude toward use was against almost all previous studies. As reported by Dewi and Natalia (2021), Sukendro et al. (2020), and Zhu et al. (2012), these studies stated that the relationship existed and significantly had positive effects. However, the effect of perceived ease of use on attitude varies greatly depending on the case, the object studied, and the target population (Indarsin & Ali, 2017). Nonetheless, this result is in line with a study by Liébana-Cabanillas et al. (2017) which stated that perceived ease of use was not significant to the attitude of acceptance of m-commerce. Moreover, a study on attitudes toward using social media in a work environment at a university in Africa found that perceived ease of use had no significant effect on attitude (Nzabandora et al., 2016). In this case, the two variables did not have a significant relationship. Based on observations, possible reasons for this case might be internet constraints or incompetent teammates.

Nevertheless, the influence of perceived usefulness corroborates with most cited studies in this research. The perceived usefulness showed positive effects and a strong relationship with attitude toward the use and intention to use. These findings align with studies by Dewi and Natalia (2021), Kim et al. (2013), Pando-Garcia et al. (2016), and Zhu et al. (2012). One possible reason for this case could be the users' needs for self-esteem or self-actualization. For example, the players would need to achieve extraordinary things like creating a city or an empire, which might not be possible in real life. Games or mobile esports could be used to fulfill these needs. Thus, users would find mobile esports helpful, respond positively, and intend to play.

Moreover, as expected, this study found no other surprising results. The positive influence between attitude toward the use and intention to use is in line with studies by Dewi and Natalia (2021), Kim et al. (2013), Pando-Garcia et al. (2016), Sukendro et al. (2020), and Zhu et al. (2012). It implied that the more positive the attitude, the higher the intention toward actual use. Users might like to play mobile esports because they feel satisfied, and they might play the games for quite a while during their free time if they can get enough satisfaction. Also, the positive effect between intention to use aligns with

studies by Dewi and Natalia (2021), Jap (2017), and Sukendro et al. (2020). The higher the intention, the higher the mobile esports usage. Playing mobile esports could be a way for users to pass the time when getting bored.

THEORETICAL AND PRACTICAL IMPLICATIONS

The implication of this study extends the esports body of knowledge in the literature. Four external variables introduced in this research has both significant and insignificant effect on mobile esports acceptance. While social interaction, enjoyment, and competition (partially) influenced the acceptance, but not visual appeal. The results emphasized the differences between typical online (video) games with mobile esports. Visual appeal in this study might not influence the perceived ease of use or usefulness. However, it could affect enjoyment, as highlighted by Merhi (2016) and Merikivi et al. (2017). Thus, it would be worth revisiting the relationship between visual appeal and enjoyment. At the same time, perceived ease of use is a strong driver for most the continued use of online games, but not in this study. It could indicate significant differences between mobile esports and typical online games, one of which is the different purposes. Users might play online games for recreational purposes, but players would use mobile esports to compete, win, or even get monetary rewards. Therefore, although users might find mobile esports challenging and hard to use, they tend to keep playing it. Since typical online games usually do not offer monetary rewards, perceived ease of use is essential to maintain users from shifting to other games. While the competition was investigated in this study and found to have a significant effect on the usefulness of mobile esports, in the subsequent study, the monetary rewards could be considered a determinant of the continuation of use.

Since this emerging technology is considered new in the sports field, the knowledge obtained from this research could be used to make esports at the same level as conventional sports. This study recommends that mobile esports providers should keep the gameplay simple. The user interface and visual updates should not drastically change the gameplay because doing so would make the games harder to utilize. Still, fresh and innovative features, such as new game items or themes, should be frequently introduced to enhance players' continued enjoyment. More efforts should be delivered to keep players enjoy with mobile esports since the enjoyment significantly drives continued use. Moreover, mobile esports providers should offer a solid platform to excite players' interactions to increase the likelihood that users feel content. Players also might develop ongoing connections through social interactions. On the other hand, the national sports ministry/agency or responsible authorities should organize many esports competitions, big or small, to search for new talents. The competitions could also stimulate players to develop their skills.

Many people are still skeptical about online games since playing games are still considered wasting time. Parents usually worry if their children play games for a long time since they would not have enough time to study and rest. However, the emergence of esports could change this perception. Nowadays, users are being paid for playing games. It also would be an excellent job if they become professional esports athletes. This study investigated factors that could affect the continued use of mobile esports. Like other jobs, playing games professionally in the long term could make the players tedious and tired. Therefore, responsible parties, like mobile esports providers or governments, could use the recommendations of this study to promote positive behavior among the players. They will not feel like working and still consider playing mobile esports a hobby if they happily do the job. In the long run, the players could also make a nation's society proud if they can be a champion in prestigious competitions.

CONCLUSION

This study's objective was to examine mobile esports' acceptance factors. It has been addressed by considering the similarities and contrasts between mobile esports and online (video) games, as well as traditional sports. This research has investigated the acceptance of mobile esports, which extended TAM using external variables such as visual appeal, social interaction, enjoyment, and competition.

Nine hypotheses were accepted, and four were rejected. The visual appeal did not affect the acceptance. Meanwhile, social interaction and enjoyment significantly affected both perceived ease of use and usefulness. However, perceived ease of use surprisingly had an insignificant effect on attitude toward using mobile esports. Moreover, competition significantly affected the acceptance, particularly on perceived usefulness.

Study Limitations

The sampling method in this study was convenient and could be considered not systematic when recruiting respondents. Therefore, the data might not represent the actual population precisely. Also, the sample size was relatively small since it only represented a city. Moreover, only one game was examined in this study which could prevent the generalizability of mobile esports. Furthermore, this study concentrated on a one-time collection of cross-sectional data.

Future Works

The following proposals for further study should be explored based on the limitations stated above. A larger sample size will be needed to generalize the results, such as for a nation. It is also preferable if the sample is randomized systematically. Future works should also investigate whether the same results are acquired in other mobile esports, such as League of Legends, Arena of Valor, PUBG Mobile, Garena Free Fire, or others. Furthermore, to extend our knowledge and deepen our understanding of the variables that influence mobile esports adoption, the subsequent research could look at other mobile esports acceptability based on characteristics of system functionality and moderator effects, such as gender, age, et cetera. Finally, longitudinal data-collecting approaches are suggested for future studies since they can follow changes in behavior over time.

References

Adams, D. A., Nelson, R. R., & Todd, P. A. (1992). Perceived usefulness, ease of use, and usage of information technology: A replication. *MIS Quarterly*, *16*(2), 227–247. https://doi.org/10.2307/249577

Alalwan, A. A., Baabdullah, A. M., Rana, N. P., Tamilmani, K., & Dwivedi, Y. K. (2018). Examining adoption of mobile internet in Saudi Arabia: Extending TAM with perceived enjoyment, innovativeness and trust. *Technology in Society*, *55*, 100–110. https://doi.org/10.1016/j.techsoc.2018.06.007

Ang, C. S., Zaphiris, P., & Mahmood, S. (2007). A model of cognitive loads in massively multiplayer online role playing games. *Interacting with Computers*, *19*(2), 167–179. https://doi.org/10.1016/j.intcom.2006.08.006

Atalay, A., & Topuz, A. C. (2018). What is being played in the world? Mobile esport applications. *Universal Journal of Educational Research, 6*(6), 1243–1251. https://doi.org/10.13189/ujer.2018.060615

Bagozzi, R. P. (2011). Measurement and meaning in information systems and organizational research: Methodological and philosophical foundations. *MIS Quarterly*, *35*(2), 261–292. https://doi.org/10.2307/23044044

Bányai, F., Griffiths, M. D., Király, O., & Demetrovics, Z. (2019). The psychology of esports: A systematic literature review. *Journal of Gambling Studies*, *35*(2), 351–365. https://doi.org/10.1007/s10899-018-9763-1

Chan, G., Huo, Y., Kelly, S., Leung, J., Tisdale, C., & Gullo, M. (2022). The impact of esports and online video gaming on lifestyle behaviours in youth: A systematic review. *Computers in Human Behavior*, *126*, 106974. https://doi.org/10.1016/j.chb.2021.106974

Chang, C. C. (2013). Examining users' intention to continue using social network games: A flow experience perspective. *Telematics and Informatics*, *30*(4), 311–321. https://doi.org/10.1016/j.tele.2012.10.006

Chauhan, S., Mittal, M., Woźniak, M., Gupta, S., & de Prado, R. (2021). A technology acceptance model-based analytics for online mobile games using machine learning techniques. *Symmetry*, *13*(8). https://doi.org/10.3390/sym13081545

Chin, W. W. (1998). The partial least squares approach for structural equation modeling. In G. A. Marcoulides (Ed.), *Modern methods for business research* (pp. 295–336). Lawrence Erlbaum.

Chiu, W., Fan, T. C. M., Nam, S.-B., & Sun, P.-H. (2021). Knowledge mapping and sustainable development of esports research: A bibliometric and visualized analysis. *Sustainability*, *13*(18). https://doi.org/10.3390/su131810354

Chung, J. B., & Kim, H.-K. (2009). Competition, economic benefits, trust, and risk perception in siting a potentially hazardous facility. *Landscape and Urban Planning*, *91*(1), 8–16. https://doi.org/10.1016/j.landurbplan.2008.11.005

Chung, P.-K., Ou, K., Wong, M. Y. C., Lau, K.-L., & Leung, K.-M. (2022). Investigation of Hong Kong students' Esports participation intentions using the theory of planned behavior approach: A structural equation model. *Human Behavior and Emerging Technologies*, *2022*, 6405085. https://doi.org/10.1155/2022/6405085

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Routledge.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*(3), 319–340. https://doi.org/10.2307/249008

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. Springer. https://doi.org/10.1007/978-1-4899-2271-7

Dewi, F. K. S., & Natalia, B. (2021). Identifying the factors of online game acceptance using Technology Acceptance Model. *Indonesian Journal of Information Systems*, *4*(1), 87–98. https://doi.org/10.24002/ijis.v4i1.4727

El-Nasr, M. S., Drachen, A., & Canossa, A. (2013). *Game analytics: Maximizing the value of player data*. Springer. https://doi.org/10.1007/978-1-4471-4769-5

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 39–50. https://doi.org/10.1177/002224378101800104

Ha, I., Yoon, Y., & Choi, M. (2007). Determinants of adoption of mobile games under mobile broadband wireless access environment. *Information & Management*, *44*(3), 276–286. https://doi.org/10.1016/j.im.2007.01.001

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, *31*(1), 2–24. https://doi.org/10.1108/EBR-11-2018-0203

Hamari, J., & Sjöblom, M. (2017). What is esports and why do people watch it? *Internet Research*, *27*(2), 211–232. https://doi.org/10.1108/IntR-04-2016-0085

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, *43*(1), 115–135. https://doi.org/10.1007/s11747-014-0403-8

Holbrook, M. B. (1994). *Service quality: New directions in theory and practice*. SAGE.

Igbaria, M., & Iivari, J. (1995). The effects of self-efficacy on computer usage. *Omega*, *23*(6), 587–605. https://doi.org/10.1016/0305-0483(95)00035-6

Indarsin, T., & Ali, H. (2017). Attitude toward using m-commerce: The analysis of perceived usefulness, perceived ease of use, and perceived trust: Case study in Ikens wholesale trade, Jakarta – Indonesia. *Saudi Journal of Business and Management Studies*, *2*(11), 995–1007.

Jang, W., Byon, K. K., & Song, H. (2021). Effect of prior gameplay experience on the relationships between esports gameplay intention and live esports streaming content. *Sustainability*, *13*(14). https://doi.org/10.3390/su13148019

Jap, T. (2017). The Technology Acceptance Model of online game in Indonesian adolescents. *Makara Human Behavior Studies in Asia*, *21*(1), 24. https://doi.org/10.7454/mssh.v21i1.3497

Jenny, S. E., Manning, R. D., Keiper, M. C., & Olrich, T. W. (2017). Virtual(ly) athletes: Where esports fit within the definition of "Sport." *Quest*, *69*(1), 1–18. https://doi.org/10.1080/00336297.2016.1144517

Kahn, A. S., Shen, C., Lu, L., Ratan, R. A., Coary, S., Hou, J., Meng, J., Osborn, J., & Williams, D. (2015). The Trojan Player Typology: A cross-genre, cross-cultural, behaviorally validated scale of video game play motivations. *Computers in Human Behavior*, *49*, 354–361. https://doi.org/10.1016/j.chb.2015.03.018

Kim, G., Choe, D., Lee, J., Park, S., Jun, S., & Jang, D. (2013). The technology acceptance model for playing console game in Korea. *IJCSNS International Journal of Computer Science and Network Security*, *13*(5), 9–12.

King, W. R., & He, J. (2006). A meta-analysis of the technology acceptance model. *Information & Management*, *43*(6), 740–755. https://doi.org/10.1016/j.im.2006.05.003

Kock, N. (2015). Common method bias in PLS-SEM: A full collinearity assessment approach. *International Journal of e-Collaboration*, *11*(4), 1–10. https://doi.org/10.4018/ijec.2015100101

Lee, D., & Schoenstedt, L. J. (2011). Comparison of esports and traditional sports consumption motives. *ICHPER-SD Journal of Research*, *6*(2), 39–44.

Lee, J., Kim, J., & Choi, J. Y. (2019). The adoption of virtual reality devices: The technology acceptance model integrating enjoyment, social interaction, and strength of the social ties. *Telematics and Informatics*, *39*, 37–48. https://doi.org/10.1016/j.tele.2018.12.006

Lee, J.-H., & Lee, C.-F. (2019). Extension of TAM by perceived interactivity to understand usage behaviors on ACG social media sites. *Sustainability*, *11*(20). https://doi.org/10.3390/su11205723

Liébana-Cabanillas, F., Marinković, V., & Kalinić, Z. (2017). A SEM-neural network approach for predicting antecedents of m-commerce acceptance. *International Journal of Information Management*, *37*(2), 14–24. https://doi.org/10.1016/j.ijinfomgt.2016.10.008

Lo, S.-K., Wang, C.-C., & Fang, W. (2005). Physical interpersonal relationships and social anxiety among online game players. *Cyberpsychology & Behavior*, *8*(1), 15–20. https://doi.org/10.1089/cpb.2005.8.15

Loiacono, E. T., Watson, R. T., & Goodhue, D. L. (2007). WebQual: An instrument for consumer evaluation of web sites. *International Journal of Electronic Commerce*, *11*(3), 51–87. https://doi.org/10.2753/JEC1086-4415110302

Low-Kam, C., Raïssi, C., Kaytoue, M., & Pei, J. (2013, December). Mining statistically significant sequential patterns. *Proceedings of the IEEE 13th International Conference on Data Mining*, *Dallas, TX, USA,* 488–497. https://doi.org/10.1109/ICDM.2013.124

Martey, R. M., & Stromer-Galley, J. (2007). The digital dollhouse: Context and social norms in The Sims Online. *Games and Culture*, *2*(4), 314–334. https://doi.org/10.1177/1555412007309583

Mathwick, C., Malhotra, N., & Rigdon, E. (2001). Experiential value: Conceptualization, measurement and application in the catalog and internet shopping environment. *Journal of Retailing*, *77*(1), 39–56. https://doi.org/10.1016/S0022-4359(00)00045-2

Mendoza, G., Clemente-Suárez, V. J., Alvero-Cruz, J. R., Rivilla, I., García-Romero, J., Fernández-Navas, M., Carrillo de Albornoz-Gil, M., & Jiménez, M. (2021). The role of experience, perceived match importance, and anxiety on cortisol response in an official esports competition. *International Journal of Environmental Research and Public Health*, *18*(6), 2893. https://doi.org/10.3390/ijerph18062893

Merhi, M. I. (2016). Towards a framework for online game adoption. *Computers in Human Behavior*, *60*, 253–263. https://doi.org/10.1016/j.chb.2016.02.072

Merikivi, J., Tuunainen, V., & Nguyen, D. (2017). What makes continued mobile gaming enjoyable? *Computers in Human Behavior*, *68*, 411-421. https://doi.org/10.1016/j.chb.2016.11.070

Montoya-Weiss, M. M., Voss, G. B., & Grewal, D. (2003). Determinants of online channel use and overall satisfaction with a relational, multichannel service provider. *Journal of the Academy of Marketing Science*, *31*(4), 448–458. https://doi.org/10.1177/0092070303254408

Nunnally, J. C. (1978). *Psychometric theory*. McGraw-Hill.

Nzabandora, W., Kamdjoug, J.-R. K., & Wamba, F. (2016, August). Factors adoption of Facebook in the workplace Cameroon. *Proceedings of the 22nd Americas Conference on Information Systems, San Diego, CA, USA.*

Olshefski, E. (2015, June). Game-changing event definition and detection in an esports corpus. *Proceedings of the 3rd Workshop on EVENTS: Definition, Detection, Coreference, and Representation, Denver, CO, USA,* 77–81. https://doi.org/10.3115/v1/W15-0810

Pando-Garcia, J., Periañez-Cañadillas, I., & Charterina, J. (2016). Business simulation games with and without supervision: An analysis based on the TAM model. *Journal of Business Research*, *69*(5), 1731–1736. https://doi.org/10.1016/j.jbusres.2015.10.046

Pengnate, S., & Sarathy, R. (2017). An experimental investigation of the influence of website emotional design features on trust in unfamiliar online vendors. *Computers in Human Behavior*, *67*, 49–60. https://doi.org/10.1016/j.chb.2016.10.018

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *The Journal of Applied Psychology*, *88*(5), 879–903. https://doi.org/10.1037/0021-9010.88.5.879

Reitman, J. G., Anderson-Coto, M. J., Wu, M., Lee, J. S., & Steinkuehler, C. (2020). Esports research: A literature review. *Games and Culture*, *15*(1), 32–50. https://doi.org/10.1177/1555412019840892

Sukendro, S., Habibi, A., Khaeruddin, K., Indrayana, B., Syahruddin, S., Makadada, F. A., & Hakim, H. (2020). Using an extended Technology Acceptance Model to understand students' use of e-learning during Covid-19: Indonesian sport science education context. *Heliyon*, *6*(11), e05410. https://doi.org/10.1016/j.heliyon.2020.e05410

Szajna, B. (1994). Software evaluation and choice: Predictive validation of the technology acceptance instrument. *MIS Quarterly*, *18*(3), 319–324. https://doi.org/10.2307/249621

To, A. T., & Trinh, T. H. M. (2021). Understanding behavioral intention to use mobile wallets in Vietnam: Extending the TAM model with trust and enjoyment. *Cogent Business & Management*, *8*(1), 1891661. https://doi.org/10.1080/23311975.2021.1891661

van der Heijden, H., Verhagen, T., & Creemers, M. (2003). Understanding online purchase intentions: Contributions from technology and trust perspectives. *European Journal of Information Systems*, *12*(1), 41–48. https://doi.org/10.1057/palgrave.ejis.3000445

Venkatesh, V., Morris, M., Davis, G., & Davis, F. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, *27*, 425–478. https://doi.org/10.2307/30036540

Vinzi, V. E., Chin, W. W., Henseler, J., & Wang, H. (2010). *Handbook of partial least squares: Concepts, methods and applications* (1st ed.). Springer. https://doi.org/10.1007/978-3-540-32827-8_1

Wang, Y. J., Minor, M. S., & Wei, J. (2011). Aesthetics and the online shopping environment: Understanding consumer responses. *Journal of Retailing*, *87*(1), 46–58. https://doi.org/10.1016/j.jretai.2010.09.002

Westland, J. C. (2010). Lower bounds on sample size in structural equation modeling. *Electronic Commerce Research and Applications*, *9*(6), 476–487. https://doi.org/10.1016/j.elerap.2010.07.003

Wu, J., & Liu, D. (2007). The effects of trust and enjoyment on intention to play online games. *Journal of Electronic Commerce Research*, *8*(2), 128–140.

Zhu, D.-S., Lin, T. C.-T., & Hsu, Y.-C. (2012). Using the technology acceptance model to evaluate user attitude and intention of use for online games. *Total Quality Management & Business Excellence*, *23*(7–8), 965–980. https://doi.org/10.1080/14783363.2012.704269

AUTHORS

Nufri Wilis obtained his Master's in Computer Science from Nusa Mandiri University, Indonesia in 2022. He has experience in software engineering. Since 2016, he has been working as a software developer in industry and government. His research interests include software technology, data mining, and information systems engineering.

Lindung Parningotan Manik received his Engineering Doctorate (EngD) degree from the Eindhoven University of Technology in 2015. He has extensive experience in software engineering. Since 2008, he has been working as a Software Designer in multiple (high) tech industries. He currently works as a Researcher at the Research Center for Data and Information Sciences, National Research and Innovation Agency (BRIN), and a Lecturer at the University of Nusa Mandiri, Indonesia. His research interests include software technology, data mining, and information systems engineering.