Understanding Online Gamers' Intention to play games online and Effects on their Loyalty: An integration of IDT, TAM, and TPB

Abstract

The theoretical understanding of e-commerce has received much attention over the past years; however, relatively little focus has been directed to online gaming. Therefore, this paper aims to examine the antecedents of Online Gamers' Intention to play games online and its effect on their loyalty based on integrating three well-recognized theories. Using PLS-SEM approach to analyze the data collected from 1,660 online gamer, the results show the integration between IDT, TAM, and TPB provide a suitable explanation for Online Gamers' Intention to play online games. Intentions to play online games are mostly determined by attitude, compatibility, and social interactions. Furthermore, gender plays a key role in understanding online gamers' intention to play and their loyalty. The findings also offer essential implications for online gaming developers and marketers.

1. Introduction

Online games come to be one of the rapidly growing internet-based entertainment industries (Koo, 2009; Lee and Tsai, 2010; Snodgrass, et al., 2017), one of the most popular online activities (Teng and Chen, 2014; Gainsbury, et al., 2017), and have become an important part of consumer culture over the past decade (Seo et al., 2015). As well as, it is considered one of the most profitable online entertaining activities (Hsu and Lu, 2004; Tseng, 2011), which noticeably attracted more and more gamers and providers as well in recent years (Hsu and Lu, 2004; Yang et al., 2009; Huang et al., 2017). So, the growing popularity of online games has attracted the attention of both practitioners and academicians and emphasizes the importance of understanding how loyalty among online gamers can be strengthened in the form of retaining the existing players and entice new ones (Yang, et al., 2009; Teng, 2017).

Understanding online gamers behaviors and the factors affecting these behaviors can significantly contribute toward the success of the online games from the marketing perspective (Wu and Liu, 2007; Wang, 2014). In the line with previous literature, our study considers customer loyalty as a critical behavioral consequent to firms' success in online settings (Teng and Chen, 2014, Hsiao and Tang, 2016), and it can be of substantial value to both customers and companies as well (Hsiao and Chen, 2016). In addition, understanding the factors driving online gamers intentions have a considerable and valuable interest from the viewpoint of designers, promoters, sponsors, and providers of online games (Wu and Liu, 2007; Merhi, 2016). We agree with Huang and Hsieh (2011) and Merhi (2016) in that research related users' adoption

of online gaming still a shortage, as well as, more specifically the area of online gamer's loyalty remains an underexplored area of research.

The online gaming becomes easier than before due to the rapid increase of broadband and extended availability of PC's, tablets, and smartphones as well as growing number of internet users (Merhi, 2016). The noticeable rising numbers of internet users has a considerable interest, as the online games are expected to be a profitable business in the future and this market will continue to grow with the rapid diffusion of broadband Internet access all over the world (Hsu and Lu, 2007; Merhi, 2016). So, the online games developers and marketers must give more attention to this noticeable rapid increase in Internet users numbers, as it shows more potential demand which must be taken in consideration when they are developing future marketing strategies (Chang et al., 2013).

According to the Egyptian Information and Communications Technology sector (ICT) reports (2016), 40% of Egyptians have an internet connection, where the number of internet users increased exponentially to reach 36.7 million users in 2017 compared to 12.3 million users in 2009, which represents more potential demand. Among these users, 37.42% use a smartphone for accessing internet. Concerning users' ages, 34% are within 15-24 years of age. Despite having the potential fun elements to play online games, only 15.3% of the users in Egypt use the internet for entertainment purposes e.g. playing and downloading games. According to the Egyptian games market, total revenue from online games was 168,248 million US dollars. In the line with Merhi (2016), this statistic evidence has opened the way for companies, to use online games as a platform for branded entertainment and to attract new customers.

Although gender plays an incredibly significant role in explaining the gamers acceptance of online games, a few numbers of researches have examined the gender

differences in the online game's context (Lee, 2009; Hsiao and Tang, 2016; Liu, 2016). There are several reasons motivate both males and females to play online games, thus, exploring the gender role in the online gaming context becomes increasingly important for both academicians and practitioners, especially when developing future marketing strategies (Chang et al., 2013; Liu, 2016).

Our research mainly seeks to 1) explore the most crucial factors that affect Online Gamers' Intention to play online games; 2) integrating three well-recognized adoption theories: the innovation diffusion theory (IDT), the technology acceptance model (TAM), and the theory of planned behavior (TPB), together with flow experience, human-computer interaction, and social interaction in a theoretical model, which may give more meaningful contributions to understand the online gamers' intention to play; 3) the moderating role of the gender in the relationship between gamers' attitude, and intention of continuing to play online games has been tested; 4) Moreover, the effect of gamers' continuing intention to play on their loyalty toward online games has been tested.

The findings will be valuable for the online gaming companies; it will help developers and marketers of online games to employ strategies that enhance the gamer's continuous intention to play online games and motivate them to try new versions of online games and recommend these games to their relatives and friends.

Our research consists of the following sections; the theoretical background concerning theories, study variables, and hypotheses development. Next, the data collection, measures, and validation are illustrated. Then, the study results, discussion, managerial implications were explained. Finally, the last section clarifies the limitations and future research.

2. Theoretical Background

2.1. Online Gaming

Nowadays online games considered one of the most popular online contents that dramatically allow gamers to play and interact with other persons all over the world through the internet (Choi and Kim, 2004). As well as, they create a virtual reality environment in which gamers can direct and control the game in the context of many various settings (Alzahrani et al., 2017). Previously, people used to play offline games, but now with the revolution of the internet they play online games, which is known as Internet-based games, where the player can interact, compete, and collaborate with players from different countries (Ding and Lii, 2016). Online games defined as the digital games in which the gamer can use any platform through the internet to interact with other players from any place and anytime (Chang et al., 2013). The online games community has defined a group of persons who can easily contact with each other over the internet platforms, which are characterized by creating and supporting relationships between gamers, satisfying their needs for entertainment, and achieving a mutual enjoyment (Hsu and Lu, 2007).

Online games continued to grow in popularity in the last decade due to the widespread of smartphones and improvements in bandwidth, information technology (IT) infrastructure, technology, and LAN capabilities (Choi and Kim, 2004; Chang et al., 2013; Alzahrani et al., 2017). As well as, it became a socially acceptable entertainment style in several countries, where gamers have a great chance to compete or collaborate with persons from other countries all over the world (Chang et al., 2013; Alzahrani et al., 2017). These finding led us to focus on this area of research in our study.

2.2. Innovation Diffusion Theory (IDT).

In 1962, Everett Rogers has originally developed the IDT, which has received substantial empirical support to explain customer adoption of new technologies in numerous disciplines, especially the online context e.g. (Yu and Wu, 2007; Hung et al., 2011; Lee at al., 2011; Amaro and Duarte, 2015; Agag and El-Masry, 2016a). According to the IDT, "Potential users make decisions to adopt or reject an innovation based on beliefs that they form about the innovation" (Agarwal, 2000, p. 90). Rogers (1995) stated that the relative advantage, compatibility, complexity, trialability, and visibility are the five IDT factors that influence and predict user's intention to adopt new technologies. In an online context, studies considered both relative advantage and compatibility as more relevant elements that explain user's intention to adopt new technologies (Lu et al., 2011, Amaro and Duarte, 2015; Agag and El-Masry, 2016b). Based on these findings, we focus on exploring the influence of these two elements on gamers' intentions to play online games.

2.3. Technology Acceptance Model (TAM).

The Technology Acceptance Model (TAM), initially developed by Davis in 1986, has been widely applied and received considerable attention from researchers and practitioners to explain how customers adopted and used new technologies in various disciplines, especially online contexts e.g. (Venkatesh and Davis, 2000; Kim et al., 2009; Lee et al., 2011; Agag and El-Masry, 2016c). According to TAM, both ease of use and usefulness considered the two main bases of the customer's attitude and intention to accept and use new technologies. Several studies applied TAM to clarify how customers accept new technology in online gaming context but they replaced

perceived enjoyment by perceived usefulness (Hsu and Lu, 2004; Wu and Liu, 2007; Lee, 2009; Lee and Tsai, 2010; Park et al., 2014; Li et al., 2015; Merhi, 2016; Alzahrani et al., 2017). Based on these findings, our research tests the influence of both perceived ease of use and perceived enjoyment on the gamer's intentions to play online games.

2.4. The Theory of Planned Behavior (TPB).

Based on the theory of reasoned action (TRA), Ajzen (1991) originally proposed the TPB, which has focused on predicting and explaining individuals' behavioral intentions at several contexts (Davis et al., 1989; Lee and Tsai, 2010). It focuses on the individual's behavior in situations in which complete control over behavior is not inherent (Ajzen, 2002; Alzahrani et al., 2017). According to TPB, a person's attitude, subjective norm, and perceived behavior control are the key predictors of customer's intentions toward adopting new technologies (Ajzen, 1991). When a person believes that the specific activity is enjoyable and will give a valuable benefit to him, receive support from others who are already engaged in that activity and trust in his/her ability to achieve the behavior, this creates a stronger intention for him/her to perform that behavior, which consequently leads to the actual performance of that particular behavior (Alzahrani et al., 2017). Although many researchers tested the TPB in different information system adoptions, few studies applied TPB to predict customer's intentions in online games adoption (Lee, 2009; Lee and Tsai, 2010; Prugsamatz et al., 2010; Alzahrani et al., 2017). Therefore, our research tests the influence of attitude, subjective norm, and perceived behavior control on the gamer's intentions to play online games.

2.5. Online gamer loyalty (LOY)

Generally, loyalty is defined as a deeply held commitment to repurchase or re-patronize a product or service regularly in the future by an earlier marketing scholar (Oliver, 1997, p. 392). Other researchers have characterized loyalty by repurchasing and WOM recommendation (Day, 1969). While, online consumer behavior researchers defined online gamers' loyalty as the repeated playing and willingness to recommend the games to others (Hsiao and Tang, 2016; Hsiao and Chen, 2016), we adopted this definition for online gamers' loyalty. Thus, the more loyalty a customer has toward a specific online game, the more he/ she stays playing the game and advises his/her relatives and friends to play that game (Choi and Kim 2004).

In line with previous literature, this study considers consumer loyalty as a critical behavioral consequence to firms' success in online settings (Teng and Chen, 2014, Chen and Wang, 2016; Hsiao and Tang, 2016), where loyal customers reduce business costs for acquiring customers and can generate considerable revenue. As well as, they are less likely to be influenced by low prices offered by competitors and are more likely to recommend new customers (Teng and Chen, 2014). Moreover, it can create a mutual benefit for both customers and companies as well (Reichheld & Detrick, 2003; Hsiao and Chen, 2016). Thus, customer loyalty becomes an essential goal at the business community and it represents a crucial component of a company's long-term viability (Chen and Wang, 2016).

3. Theoretical Development and Research Hypotheses

Grounded in the IDT, TAM, and TPB, this study integrates between well-recognized elements; perceived relative advantages, compatibility, perceived ease of use, perceived enjoyment, subjective norms, perceived behavioral control, flow experience, human-computer interaction, social interaction, and gamers attitudes as a predictors of their intentions to play online games and their loyalty as outcomes in a conceptual framework as shown in Fig.1. The current study also concentrates on exploring the moderating role of gender in the relationship between attitude, intentions to play, and online gamer loyalty. The development of hypotheses is discussed as follows.
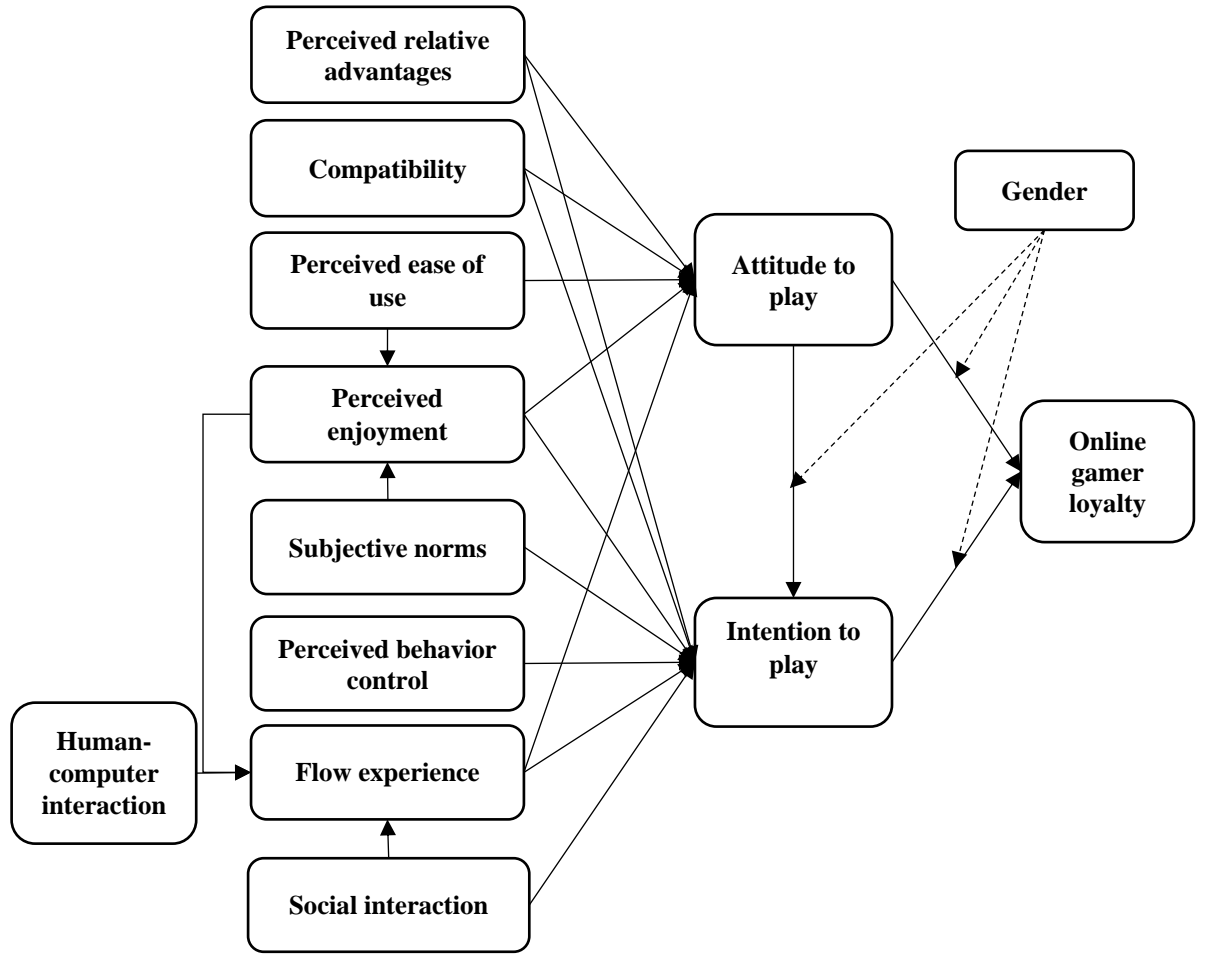
Fig. 1. The Theoretical Model

3.1. Perceived Relative Advantages, Compatibility, Attitude, and Intention to Play Online Games.

Perceived relative advantages (RLD) considered one of the key constructs of IDT, it is defined as "the degree to which an innovation is perceived as better than the idea it supersedes" (Rogers, 1995, p. 15). In other words, it is a comparison between particular innovation and its alternatives (Amaro and Duarte, 2015). For the purposes of our study, the perceived relative advantage is defined as the degree to which online games delivers welfare to gamers or is more beneficial than traditional computer games in the form of having fun, convenience, escaping from boredom, using of creative skills, and making relations with other gamers.

Perceived compatibility (COM) considered the second main construct of IDT, Rogers (1995) defined it as "the degree to which an innovation is perceived as being consistent with existing values, past experiences, and needs of potential adopters" (p. 15). We defined it for the purpose of our study as the extent to which online gamers expect that their needs would fulfil through playing online games and it will be suitable to their lifestyle and preferences.

Numerous studies in online context showed a significant positive influence of perceived relative advantages on attitude (Amaro and Duarte, 2015; Agag and El-Masry, 2016a). Lee et al. (2011) and Lu et al. (2011) found a significant positive influence of perceived relative advantages on behavioral intentions. Amaro and Duarte (2015) and Agag and El-Masry (2016a) confirmed that perceived compatibility significantly affects attitude. In addition, Wu and Wang (2005); Lee et al. (2011); Lu et al. (2011); Amaro and Duarte (2015) and Agag and El-Masry, 2016b) identified a

significant influence of perceived compatibility on behavioral intention. Thus, the following hypotheses can be formulated:

H 1. Perceived relative advantages positively influence gamer's attitude toward online games playing.

H 2. Perceived relative advantages positively influence gamer's intention toward online games playing.

H 3. Perceived compatibility positively influences gamer's attitude toward online games playing

H 4. Perceived compatibility positively influences the gamer's intention toward online games playing

3.2. Perceived Ease of Use, Perceived Enjoyment, Attitude, and intention to play online games.

According to TAM, both perceived ease-of-use and usefulness are the key determinants of user's attitude and intention to adopt new technologies. In accordance with Hsu and Lu (2004), we defined PEU as the extent to which the online gamer believes that playing online games was effortless. Davis (1989, p.320), considered perceived usefulness as the second factor affect the users to adopt new technologies, it defined as "the degree to which a person believes that using a particular technology would enhance his/her job performance".

Hsu and Lu (2007) and Lee and Tsai (2010) state that perceived usefulness is not a perfect measure for the online gaming context because of the core purpose of playing online games represented in the entertainment, not achieving particular goals

or improving the performance. Therefore, they replaced this variable with perceived enjoyment, which will indicate liking or disliking such a game. In our study, and in line with the previous studies in online gaming literature (Van der Heijden, 2003; Hsu and Lu, 2007; Koo, 2009; Lee, 2009; Lee and Tsai, 2010; Park et al., 2014; Hsiao and Tang, 2016; Alzahrani et al., 2017), we focus on Perceived Enjoyment (PEN) as a second determination of user's attitude and intentions instead of perceived usefulness. For the purpose of our study, perceived enjoyment defined as the extent to which the online gamers perceived pleasure, excitement, and fun, apart from any kind of performance resulting from game use.

Numerous studies showed significant positive influence of perceived ease of use on attitude in online context (Van der Heijden, 2003; Kim et al., 2009; Agag and El-Masry, 2016a) and online gaming context (Hsu and Lu, 2004; Lee and Tsai, 2010; Park et al., 2014). Hsu and Lu (2004); Lee and Tsai (2010); Park et al. (2014) confirmed that perceived ease of use significantly affects perceived enjoyment. As well as, Hsu and Lu (2004); Wu and Liu (2007); Lee (2009); Lee and Tsai (2010); Park et al. (2014) and Alzahrani et al. (2017) found that perceived enjoyment significantly and positively influence attitude toward online games playing. In addition, Wu and Liu (2007); Koo (2009); Lee (2009); Lee and Tsai (2010); Park et al. (2014); Li et al. (2015); Merhi (2016) and Alzahrani et al. (2017) confirmed a significant influence of perceived enjoyment on intention to play online games. Moreover, Merhi (2016) found strong significant positive influence of perceived enjoyment on flow experience. Consequently, the following hypotheses can be formulated:

H 5. Perceived ease of use positively influences gamer's attitude toward online games playing.

H 6. Perceived ease of use positively influences gamer's perceived enjoyment.

H 7. Perceived enjoyment positively influences gamer's attitude toward online games playing

H 8. Perceived enjoyment positively influences gamer's intention toward online games playing

3.3. Attitude, Subjective Norms, Perceived Behavior Control, and Intention to Play Online Games.

The prediction of individual's intentions is mainly determined by three key constructs: attitude, subjective norm, and perceived behavioral control according to TPB (Ajzen, 1991; Ajzen, 2002). Attitude (ATT) refers to user preferences regarding online games playing (Hsu and Lu, 2004) or the individual's feelings regarding achieving the target behavior (Lee and Tsai, 2010). For the purpose of the current study, attitude is defined as the strength of a person's favourable or not favourable feeling towards online games playing. Therefore, it is expected that positive attitudes toward a specific behavior will lead to higher intentions to do that behavior (Ajzen, 1987; Amaro and Duarte, 2015).

In the online context, Subjective Norms (SUB) plays a crucial role in enhancing users' intention; subjective norm can even encourage other persons to contribute in such communities (Hsu and Lu, 2007; Alzahrani et al., 2017). For the purpose of the current study, the subjective norm refers to the person's motivation to play online games according to the opinions of his/her referents. So, Subjective norm relates to the support provided by important people like family members, friends, colleagues, or significant referents who significantly encourage others to perform a specific behavior (Kim et al., 2009; Lee and Tsai, 2010; Alzahrani et al., 2017).

Ajzen (1991) added perceived behavioral control (PBC) factor to the TRA. This factor added to overcome the TRA limitations in dealing with behaviors over which people have incomplete volitional control (Ajzen, 1991). So, if the individual believes that he/she has the resources, abilities, and opportunities to do a particular behavior, he/she will have the self-confidence to perform that behavior and show a high level of perceived behavioral control (Ajzen, 1991; Ajzen, 2002; Amaro and Duarte, 2015). Perceived behavioral control refers to "people's perception of ease or difficulty in performing the behavior of interest" (Ajzen, 1991, p. 183). It relates to the individual's feelings about their capacity to implement the aimed behavior (Alzahrani et al., 2017). For our study, perceived behavior control is defined as the gamer's feelings toward his/her ability to play online games.

According to TPB and TAM attitudes are considered key determinant of users' behavioral intentions. Several studies confirmed the positive influence of attitude to play online games on intention to play online games (Hsu and Lu, 2004; Wu and Liu, 2007; Lee and Tsai, 2010; Prugsamatz et al., 2010; Park et al., 2014; Alzahrani et al., 2017). As well as, Wu and Liu (2007); Lee (2009); Lee and Tsai (2010); Prugsamatz et al. (2010); Chang et al. (2014) and Alzahrani et al. (2017) found a strong positive influence of subjective norms on intention to play online games. Lee (2009); Lee and Tsai (2010); Prugsamatz et al. (2010) and Alzahrani et al. (2017) confirmed a significant positive effect of perceived behavior control on intention to play online games. Moreover, Kim et al. (2009) confirmed a significant positive influence of subjective norms on perceived usefulness. Thus, we formulated the following hypotheses:

H 9. Attitude toward play online games positively influences gamer's intention toward play online games.

H 10. Subjective norms positively influence gamer's intention toward play online games.

H 11. Perceived behavior control positively influences the gamer's intention toward play online games

H 12. Subjective norms positively influence perceived enjoyment.

3.4. Flow experience, attitude, and continuous intention to play online games.

According to Flow theory, flow refers to "the holistic sensation that people feel when they act with total involvement" (Csikszentmihalyi, 1975 p. 36). It is a state in which the gamer is completely involved in a certain activity (Merhi, 2016). In other words, if that gamer is engaged in a flow state, he/she will prefer to remain in that state (Hsiao and Tang, 2016). When people experience flow, they become captive to this task or behavior and unable to recognize or aware what occurs around them as well as sometimes they forget the time and experiencing the mental enjoyment of that activity (Merhi, 2016; Lee and Tsai, 2010). Cheung et al. (2003) believe flow theory is useful in explaining consumer's continous behavior. In our study, we focus on how the flow experience affects gamer's intention toward online games playing.

Numerous studies showed strong positive influence of flow experience on attitude toward play online games (Lee, 2009; Lee and Tsai, 2010; Alzahrani et al., 2017). Hsu and Lu (2004); Lee (2009); Lee and Tsai (2010); Chang et al., 2014 and Alzahrani et al. (2017) confirmed a significant positive influence of flow experience on intention to play online games. Thus, our hypotheses are as follows:

H 13. Flow experience positively influences the gamer's attitude toward play online games.

H 14. Flow experience positively influences the gamer's intention toward play online games.

3.5. Human-Computer Interaction, Social Interaction, Attitude, and Continuous Intention to Play Online Games.

Human interaction has attracted the attention of researchers in the online context as the primary driver to continue playing (Martey and Stromer-Galley, 2007). Generally, the interaction is considered one of the essential features of digital games, where the best game allows higher interaction between individuals (Lewinski, 1999, p.8; Alzahrani et al. 2017), this interaction not only within the game but also outside the game (Laurel, 2013, p.124). According to Laurel (2013, p.124), interaction refers to the communicating behavior with other persons and each one influences the others through playing together or against common opponents. Multiplayer games allow players to interact with each others by sharing resources, develop a common strategy or defending against common enemies, such those interactions supports the widespread of online games (Choi and Kim, 2004). Lee (2009), Lee and Tsai (2010) and Alzahrani et al. (2017), classified interaction into two types: human-computer interaction (HCI) and social interaction (SOI) and we follow the same classification.

Human-computer interaction (HCI) defined as the interaction, which exists between the users and the system/computer (Lee, 2009; Lee and Tsai, 2010). In addition, the human-computer interaction mainly influences the user acceptance or rejection of the game (Alzahrani et al., 2017). Social interaction (SOI) defined as the

interaction that occurs between two or more gamers (Lee, 2009; Lee and Tsai, 2010), which assists them to make social relationships (Huang and Hsieh, 2011). Online games offer an alternative channel for gamers to rapidly communicate, share experience, socialize, and form virtual communities (Ang et al., 2007). As well as, it helps the persons to have friends especially for those who find it difficult to make friendships in real-life.

Numerous studies reported a positive significant influence of human-computer interaction on flow experience of online game players (Lee, 2009; Lee and Tsai, 2010; Alzahrani et al., 2017). Choi and Kim (2004); Lee (2009); Lee and Tsai (2010) and Alzahrani et al. (2017) confirmed a strong impact of social interaction on flow experience of online game players. As well as, Hsu and Lu (2004), Li et al. (2015) and Merhi (2016) confirmed a significant positive affect of social interaction on intentions toward play online games. Thus, four hypotheses were proposed as follows.

H 15. Human-computer interaction positively influences the flow experience of online game players.

H 16. Social interaction positively influences the flow experience of online game players.

H 17. Social interaction positively influences the gamer's intentions toward play online games.

3.6. Attitudes, Continuous Intention to Play Online Games, and Online Gamer Loyalty.

In the online context, a customer may support and encourage others to use the online community products and services if it provides a higher value compared to the value offered by traditional alternatives. Therefore, if this situation occurs the

customers will seek to use this new services or products and remain loyal to these communities by repurchasing and spread positive WOM (Agag and El-Masry, 2016a).

On the relationship between attitudes toward play online games and online gamer's loyalty, several studies confirmed a significant positive influence on attitudes and loyalty. Lien and Cao (2014) confirmed a strong positive influence of attitude on WOM. As well as, Agag and El-Masry (2016b) confirm a significant influence of attitudes toward online community on both repurchase intentions and word of mouth.

Regarding the relationship between intention to play online games and online gamer's loyalty, several studies confirmed a significant positive influence of behavioral intentions on loyalty. Van der Heijden (2003) and Wu and Wang (2005) pointed out the positive relationship between intentions and actual usage. As well as, Agag and El-Masry (2016c) confirm a significant influence of intention to participate in the online community on both repurchase intentions and WOM. In the online game context, Lee (2009) confirmed the positive influence of the behavioral intention to play online games on actual behavior. Thus, two hypotheses were proposed as follows.

H 18. Attitude toward play online games positively influences online gamer's loyalty.

H 19. Intention to play online games positively influences online gamer's loyalty.

3.7.Moderators of Gender.

Gender is considered one of the most common variables to explore and explain the individual differences, especially in the user's technology adoption context (Zhou et al., 2014; Zhu and Chang, 2014). The female's Internet usage noticeably increased in the past few years, as well as, a great number of those females are playing online games

with a growing trend (Hsiao and Tang, 2016; Liu, 2016). Hsiao and Chen (2016) found that gender differences had a strong positive influence on users' purchase intentions for mobile games. Lee (2009); Liu (2016) and Hsiao and Tang (2016) confirmed the moderating role of gender in predicting player's behavior in online games context, which helps both academicians and practitioners to have a clearer understanding of the online game market. Lee (2009) found that the gender moderated the relationship between attitudes on intention. This leads us to explore the moderating role of gender in the relationships between attitudes, intention to play an online game and online gamer loyalty. Thus, three hypotheses can be formulated as follows.

H 20. Gender moderates the relationship between attitudes and intention to play an online game.

H 21. Gender moderates the relationship between attitudes and online gamer's loyalty.

H 22. Gender moderates the relationship between intention to play an online game and online gamer's loyalty.

4. Research Methodology

4.1. Sampling and Data Collection

Using online questionnaire this study collected its data through posting invitations on popular online gaming forums and community websites, which well-known and familiar among online gamers for the duration of 6 weeks. Hence, our sampling population was online gamers who visited those forums and community websites. The researchers posted the questionnaire on more than 25 forums and website. The gamers who respond to the invitation reported that their favourite online games are (each gamer has chosen one game): League of Legends (43.7%), Baseball Online

(17.2%), Diablo (10.3%), Dungeon & Fighter (6.8%), Lineage (3.4%), World of Warcraft (2.6%), and others.

The online questionnaire link was presented to the potential respondents, which informed them that our study is related to evaluating online games. The respondent who completed and submitted a valid questionnaire had the opportunity to join in a lottery to express our gratitude for respondents' participation in our study. The lottery provided a US$10 gift for each winner of 40 winners chosen. In total, 1,874 responses were obtained, however, 214 of them were invalid and we excluded it. Therefore, the total valid responses were 1,660 responses, which produced a valid ratio of 88.6%.

Several reasons may be behind the high ratio of valid responses to total responses. First, only interested gamers were invited to participate and get access to complete the questionnaire. Second, automatically the online questionnaire cannot permit the respondent to submit the questionnaire unless he/she answer all items. Third, the associated lottery encouraged the respondents to provide accurate and sincere responses.

We perform a pilot test to evaluate the research instrument validity and reliability. The instrument has been directed to a set of sample units who are already playing online games and a set of the specialists in the field of online gaming, to ensure that if the target audience definitely understand the various scales. Depending on their responses and comments, we modified the questionnaire. Then, we compiled data from sample units.

Our questionnaire consists of two parts. The first one includes all study constructs items, which have a reflective measurement. The second part includes some

questions about the respondents' demographic features. Our proposed model has twelve constructs rated on a 5-point Likert scale (from 5- strongly agree to 1- strongly disagree).

Perceived relative advantages is measured by four items used in previous studies (Lu et al., 2011; Agag and El-Masry, 2016b). To conceptualize the compatibility, the current study depends on three items adopted by Wu and Wang (2005). Three items as suggested by Lee and Tsai (2010); Hsu and Lu (2004) scale measured the variables of perceived ease of use. Perceived enjoyment was measured by four items derived from Koo (2009); Lee and Tsai (2010); Merhi (2016) and Hsiao and Tang (2016). Three items for each construct borrowed from Lee and Tsai (2010) measured the scales for attitude, subjective norms, and perceived behavioral control. Four items derived from Kim et al. (2005); Lee and Tsai (2010); Hsiao and Tang (2016) to measure flow experience. The variables of human-computer interaction and social interaction were operationalized with three items each as suggested by Lee and Tsai (2010). The scale for the intention to play was adapted from Lee and Tsai (2010); Merhi (2016) and Liu (2016). Finally, four items derived from Huang and Hsieh (2011); Teng and Chen (2014) and Hsiao and Tang (2016) to measure online gamer loyalty. All constructs scale developed and modified based on pilot study results. It should be noted that all study constructs have a reflective measurement, where the indicators are considered to be functions of the latent construct (Hair, Ringle, & Sarstedt, 2011; Hair et al., 2010).

The current study depends on the partial least squares (PLS-SEM) to analyze our data collected. Urbach and Ahlemann (2010) stated that it is better to use this approach when the phenomenon was new and the study aims to generate a theory. We have chosen this approach as it not sensitive to the normal distribution (Wang et al., 2013; Hair et al.,

2014). Moreover, it is considered a more suitable to use when analyzing a large number of constructs, and it is very robust against multicollinearity (Cassel et al., 2000).

5. Results

In accordance with Hair et al. (2014), PLS-SEM approach was used to assess our proposed model in two steps. The first one related to evaluating the measurement model. After that, the authors evaluated the structural model or in other words, testing hypotheses (Hair et al. 2014).

5.1. Measurement Model

The skewness, kurtosis, and Mahalanobis distance statistics normality tests were performed to fulfil the criterion of multivariate normality as shown in Table 6, which refers to that no problem in normality for our data collected. We also performed tests for multicollinearity due to the relatively high correlations among some of the constructs. All constructs had variance inflation factors (VIF) values less than 2.8, which is within the cut off level of 3.0.

To evaluate the measurement model the tests of reliability and validity should be performed for each construct. The reliability testing includes both construct measure's indicator and internal consistency reliability, as well as, the validity testing include both convergent and discriminant validity (Chin, 2010; Klarner et al., 2013). The results of our proposed model reliability and validity illustrated in Tables 2 and 3. All indicators items loadings were more than 0.50, which indicates that all our indicators were reliable according to Fornell and Larcker (1981) and Hair et al (2014).

Each construct internal consistency was supported as the values of both Cronbach's α and Composite Reliability (CR) are above 0.7.

Convergent validity was supported as the Average Variance Extracted (AVE) for each construct above 0.50. The discriminant validity also supported, where the square root of the AVE of each construct exceeds its correlations with any other construct in all cases. So, the measurement model was supported.

The common method bias dilemma does not exist in our dataset collected as we implemented the principal component factor analysis, thus the probable risk of common methods bias was eliminated. The largest factor accounted for 34.17% (the variances explained ranges from 16.25% to 34.17%) and no general factor accounted for more than 50 % of the variance.

Furthermore, the Cohen (1988) effect size f_2, defined as "the degree to which the phenomenon is present in the population," was used to further examine the substantive effect of the research model. Cohen (1988) suggested 0.02, 0.15, and 0.35 as operational definitions of small, medium, and large effect sizes, respectively. Thus, our model suggested that both attitude ($f_2 = 0.69$) and online gamer loyalty ($f_2 = 0.53$) have large effect sizes whereas continues intention ($f_2 = 0.23$) has medium effect sizes.

The study tests the predictive validity of the structural model following the Stone–Geisser Q_2. According to Roldán and Sánchez-Franco (2012), in order to examine the predictive validity of the research model, the cross-validated construct redundancy Q_2 is necessary. A Q_2 greater than 0 implies that the model has predictive validity. In the main PLS model, Q_2 is 0.67 for attitude, 0.58 for continues intention, and 0.51 for online gamer loyalty that is positive and hence satisfies this condition.

5.2. Structural Model

The second step in the evaluation of our proposed model is the structure model evaluation, where the hypotheses accepted or rejected.

Our proposed model has a high prediction capacity as it explains 68% for attitude, 73% for continuous intention to play online games, and 59% for online gamer loyalty.

Figure 2 illustrates the outcomes of our proposed hypotheses H1-H24, which tested by the SEM. The global fit indicators were suitable as, APC= (0.186, $p<0.001$), ARS= (0.668, $p <0.001$), AARS = (0.627, $p <0.001$), AVIF = (2.193), and GOF= (0.675).
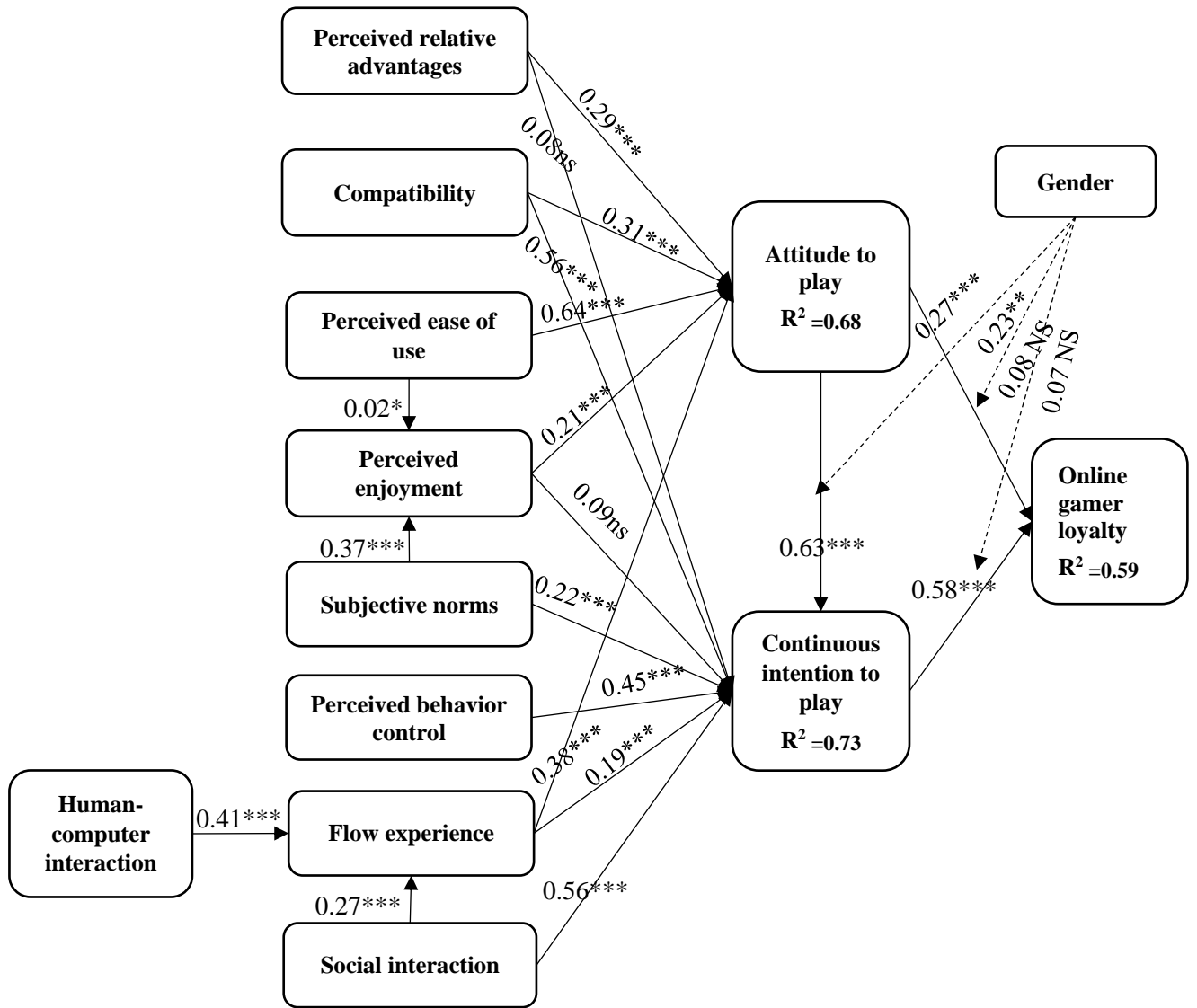
Fig. 2. PLS results of research model of the main test.

Table 4 illustrates in details the path coefficients and its significance for all hypotheses examined as follows.

Unlike our expectation, the influence of perceived relative advantages on continuous intentions to play online games was not confirmed (β =0.09). While, our findings confirmed the positive impact of perceived relative advantages on gamers attitude toward play online games (β=0.29, p<0.001). Therefore, the H1 not supported but H2 was supported.

Our findings supported the significant positive effect of compatibility on both gamers' attitude toward playing online games (β =0.31, p<0.001) and their continuous intentions to play (β =0.56, p<0.001). Thus, H3 and H4 were supported.

Regarding H5, as expected the positive influence of perceived ease of use on gamer's attitude was supported (β =0.64, p<0.001). The same result for H6 as perceived ease of use influences perceived enjoyment positively and significantly (β =0.02, p<0.05).

The hypotheses H7 was supported as perceived enjoyment positively affected on attitude (β=0.21, p<0.001), while, perceived enjoyment has no positive influence on intentions toward play online games.

Our results supported the significant positive effect of attitude (β = 0.63, p<0.001), subjective norms (β = 0.22, p<0.001), and perceived behavioral control (β = 0.45, p<0.001) on gamer's continuous intentions to play online games. Thus, H 10, H11, and H12 supported. Hypothesis 13 concerned the influence of subjective norms on perceived enjoyment also supported (β = 0.37, p<0.001).

Hypotheses 13 and 14 related to the positive influence of Flow experience on gamers attitude (β =0.38, p<0.001) and their continuous intention toward play online games (β=0.19, p<0.001) were supported.

Human-computer interaction (β =0.41, p<0.001) and social interaction (β =0.27, p<0.001) significantly and positively effect on online game players flow experience. As well as, social interaction significantly and positively impact on gamers intentions toward play online games (β =0.56, p<0.001). Thus, the H15, H16, and H17 were confirmed.

Hypotheses 18 and 19 were confirmed as the gamer's attitude (β =0.27, p<0.001), and their continuous intention toward play online games (β=0.58, p<0.001) positively impact on their loyalty.

Hypotheses H20 was supported, as the gender moderates the relationship between gamers attitudes and intention toward play online games (β =0.23, p<0.001), while, the gender does not moderate the relationship between gamers intention toward playing online games, attitudes, and their loyalty.

5.3. Rival Model

According to Kenneth and Scott Long (1992), we compared rival models as an agreement between majority researchers who performed SEM technique. In the line with Morgan and Hunt (1994) and Hair et al (2010), and Agag (2017) the authors propose a rival model where each mediator constructs (i.e. perceived enjoyment, flow experience, attitude, and continuous intention to play) represent an antecedents of online gamer loyalty with other independent constructs.

Based on Morgan and Hunt (1994); Hair et al (2010), the criteria that the authors depend on to assess the rival model are; the overall fit of the model, and the percentage of the hypothesized parameters supported. The global fit indicators are; APC = (0.694), ARS = (0.657), AARS = (0.623), AVIF= (2.142), and GOF= (0.680). As expected, all the goodness of fit measures had not reached the satisfactory ratios as only three hypothesized paths of twenty (36%) are supported at the ($p<.01$) level. Conversely, nineteen hypothesized paths of twenty-one (90%) are supported in our proposed model at the same significance level.

5.4.Mediation testing

To test the mediating role of the independent variables on online gamer loyalty via perceived enjoyment, flow experience, attitude, and continuous intention to play online games we implement 4 separate analyses according to Baron and Kenny's (1986). As shown in Table 5, our findings supported all the proposed indirect paths. In addition, the full mediation model was supported. Moreover, the Sobel test was performed. Finally, our findings supported the mediating influence of perceived enjoyment ($p<0.001$), flow experience ($p<0.001$), attitude to playing ($p<0.001$), and continuous intention to play online games ($p<0.001$).

Table 1

Sample profile

Variable	Categories	Frequency	Percent
Gender	Male	950	57.00%
	Female	710	43.00%
Place of play online game	Home	519	31.00%
	Campus	310	19.00%
	Cyber/net café	789	47.00%
	Others	42	3.00%
Online gaming experience	Less than 1 year	322	19.00%
	1-3 years	610	37.00%
	Over 3 years	728	44.00%
Number of playing times per week	Rarely	118	7.00%
	Once a week	658	40.00%
	Several times a week	621	37.00%
	Once a day	62	4.00%
	Several times a day	201	12.00%
Time spent in play each time	Less than 1 hour	448	27.00%
	1-3 hours	927	56.00%
	Over 3 hours	285	17.00%
Total time spent in play per week	Less than 1 hour	126	8.00%
	1-5 hours	784	47.00%
	6-10 hours	635	38.00%
	Over 10 hours	115	7.00%

Table 2

Loadings and cross-loadings of measurement items

Items	RLD	COM	PEU	PEN	SUB	PBC	FLO	HCI	SOI	ATT	INT	LOY	P-value
RLD1	**(0.883)**	-0.097	-0.036	-0.077	-0.049	-0.068	-0.043	-0.032	-0.112	-0.019	0.053	0.158	<0.001
RLD2	**(0.896)**	0.020	-0.030	-0.090	0.117	0.023	-0.012	-0.049	-0.102	0.195	0.102	-0.080	<0.001
RLD3	**(0.875)**	0.013	-0.031	-0.034	-0.023	-0.090	-0.039	0.022	0.039	0.093	-0.043	-0.069	<0.001
RLD4	**(0.876)**	0.016	0.135	0.168	-0.266	0.039	0.149	0.1438	0.141	-0.239	-0.100	-0.067	<0.001
COM1	0.060	**(0.894)**	-0.029	0.013	-0.073	0.060	0.020	0.113	-0.131	0.039	-0.093	-0.040	<0.001
COM2	0.015	**(0.808)**	0.038	0.087	-0.090	-0.021	-0.290	0.491	-0.099	-0.023	0.077	0.019	<0.001
COM3	-0.032	**(0.930)**	-0.011	-0.108	0.049	0.047	0.221	-0.332	0.212	-0.029	0.034	0.059	<0.001
PEU1	-0.080	0.074	**(0.820)**	0.150	-0.041	-0.123	0.049	-0.199	0.028	-0.223	0.029	0.086	<0.001
PEU2	0.062	-0.039	**(0.841)**	-0.114	-0.019	0.093	0.030	-0.333	-0.042	0.129	-0.194	0.139	<0.001
PEU3	0.014	-0.001	**(0.804)**	-0.041	0.037	0.134	-0.120	0.197	-0.049	0.099	0.022	-0.201	<0.001
PEN1	0.168	-0.189	0.032	**(0.883)**	-0.012	0.056	0.012	-0.430	-0.022	0.123	-0.148	0.033	<0.001
PEN2	-0.056	0.074	-0.140	**(0.873)**	-0.057	-0.089	-0.049	-0.562	0.089	0.043	0.094	0.060	<0.001
PEN3	-0.001	0.099	0.092	**(0.868)**	-0.003	0.031	-0.019	-0.74	0.039	-0.119	-0.034	0.188	<0.001
PEN4	-0.009	0.038	0.018	**(0.859)**	0.145	-0.048	0.002	0.034	0.019	-0.048	0.104	-0.203	<0.001
SUB1	-0.167	0.037	0.010	0.279	**(0.890)**	0.041	0.079	0.395	-0.022	-0.120	-0.012	0.039	<0.001
SUB2	0.127	0.130	0.044	-0.153	**(0.893)**	-0.031	-0.060	-0.894	0.030	-0.099	0.074	-0.073	<0.001
SUB3	0.038	-0.147	-0.068	-0.104	**(0.831)**	0.014	0.070	0.234	0.012	0.139	-0.932	0.074	<0.001
PBC1	-0.108	0.067	-0.011	0.015	0.071	**(0.837)**	-0.112	0.272	-0.033	-0.024	0.034	-0.093	<0.001
PBC2	-0.003	0.055	0.021	-0.180	0.1399	**(0.839)**	0.049	-0.885	0.012	0.010	0.020	-0.134	<0.001
PBC3	0.180	-0.143	-0.078	0.176	-0.109	**(0.890)**	0.097	-0.106	-0.090	-0.023	-0.022	0.130	<0.001
FLO1	0.080	-0.192	0.313	0.093	-0.148	0.025	**(0.871)**	0.200	0.010	-0.349	-0.210	0.188	<0.001
FLO2	-0.034	-0.034	0.009	-0.038	0.030	0.023	**(0.880)**	-0.009	-0.040	0.299	-0.088	-0.030	<0.001
FLO3	-0.031	0.046	-0.127	-0.184	0.030	0.056	**(0.899)**	0.996	0.139	-0.030	0.330	-0.134	<0.001
FLO4	-0.009	0.190	-0.144	0.144	0.038	-0.457	**(0.846)**	0.109	-0.122	0.149	-0.112	0.049	<0.001
HCI1	0.134	0.047	-0.070	0.078	-0.159	-0.041	0.069	**(0.870)**	0.130	0.112	-0.049	0.039	<0.001
HCI2	-0.004	-0.040	-0.087	-0.043	-0.019	0.024	-0.040	**(0.866)**	-0.012	0.022	0.000	0.030	<0.001
HCI3	-0.063	0.046	0.070	-0.036	0.178	0.073	0.070	**(0.891)**	-0.132	-0.139	0.029	-0.060	<0.001
SOI1	0.049	0.038	-0.097	-0.044	-0.058	-0.073	-0.067	0.107	**(0.863)**	-0.192	0.389	-0.190	<0.001
SOI2	-0.017	0.089	-0.008	-0.050	0.085	0.014	-0.080	0.104	**(0.837)**	0.119	-0.122	0.093	<0.001

	RLD	COM	PEU	PEN	SUB	PBC	FLO	HCI	SOI	ATT	INT	LOY	P value
SOI3	0.068	-0.155	0.104	0.090	-0.050	-0.063	0.104	-0.502	**(0.856)**	0.060	-0.123	0.003	<0.001
ATT1	0.017	-0.061	0.053	0.250	-0.020	-0.067	0.060	-0.105	0.039	**(0.886)**	0.010	-0.020	<0.001
ATT2	0.078	0.010	-0.017	-0.088	-0.083	0.060	0.012	-0.916	0.022	**(0.915)**	-0.327	0.029	<0.001
ATT3	-0.031	0.041	-0.005	-0.163	0.067	0.051	-0.050	0.031	-0.013	**(0.881)**	0.099	0.039	<0.001
INT1	0.028	-0.109	-0.078	0.027	-0.158	0.002	0.012	0.912	0.293	0.141	**(0.914)**	-0.043	<0.001
INT2	-0.073	0.129	0.040	-0.054	0.028	0.006	-0.090	-0.491	-0.014	-0.122	**(0.903)**	-0.066	<0.001
INT3	-0.090	-0.020	-0.046	0.022	0.060	-0.009	-0.039	0.029	-0.203	0.039	**(0.918)**	0.094	<0.001
LOY1	0.048	-0.023	0.040	-0.027	0.290	-0.032	-0.030	-0.418	0.139	-0.202	0.217	**(0.738)**	<0.001
LOY2	-0.098	0.016	0.067	0.062	-0.166	0.061	-0.023	0.542	-0.099	-0.054	0.185	**(0.879)**	<0.001
LOY3	0.083	0.031	0.085	-0.018	-0.134	0.030	0.140	-0.340	-0.134	-0.167	-0.156	**(0.874)**	<0.001
LOY4	0.043	-0.045	-0.156	-0.031	0.038	-0.021	-0.089	0.05	0.030	0.431	-0.238	**(0.848)**	<0.001

Notes:

- **RLD**=Perceived relative advantages; **COM**=Compatibility; **PEU**=Perceived ease of use; **PEN**=Perceived enjoyment; **SUB**=Subjective norms; **PBC**= Perceived behavioral control; **FLO**= Flow experience; **HCI**= Human-computer interaction; **SOI**= Social interaction; **ATT**=attitude; **INT**= Continuous Intention to play; **LOY**=online gamer loyalty.

- Factor loadings are in a bold format.

Table 3

Cronbach's α, composite reliability, and convergent/discriminant validity testing results.

Construct	CR	α	AVE	Correlations and square roots of AVE											
				RLD	COM	PEU	PEN	SUB	PBC	FLO	HCI	SOI	ATT	INT	LOY
RLD	0.893	0.831	0.680	**(0.838)**											
COM	0.943	0.829	0.722	0.582	**(0.819)**										
PEU	0.903	0.871	0.602	0.329	0.494	**(0.803)**									
PEN	0.965	0.871	0.729	0.583	0.520	0.494	**(0.850)**								
SUB	0.899	0.792	0.702	0.489	0.428	0.488	0.539	**(0.847)**							
PBC	0.931	0.881	0.627	0.434	0.472	0.304	0.483	0.393	**(0.871)**						
FLO	0.889	0.832	0.671	0.590	0.579	0.348	0.553	0.337	0.392	**(0.782)**					
HCI	0.831	0.810	0.679	0.439	0.267	0.483	0.369	0.353	0.472	0.459	**(0.804)**				
SOI	0.932	0.917	0.780	0.476	0.329	0.340	0.432	0.397	0.389	0.457	0.325	**(0.851)**			
ATT	0.903	0.972	0.596	0.550	0.570	0.653	0.670	0.439	0.376	0.516	0.345	0.439	**(0.838)**		
INT	0.951	0.917	0.801	0.467	0.428	0.439	0.528	0.439	0.620	0.324	0.489	0.398	0.618	**(0.893)**	
LOY	0.896	0.882	0.691	0.468	0.520	0.538	0.520	0.529	0.398	0.390	0.348	0.434	0.634	0.704	**(0.871)**

Note. Cronbach's **α** (α), Composite Reliability (**CR**), Average Variance Extracted (**AVE**), Maximum Shared

Squared Variance (**MSV**), and Average Shared Squared Variance (**ASV**)

Table 4

Hypotheses testing results.

Hypotheses	Path directions	Beta Values (β)	P value	Result
Direct				
H1	RLD → ATT	0.29	<0.001	Accepted
H2	RLD → INT	0.09	0.23	Rejected
H3	COM → ATT	0.31	<0.001	Accepted
H4	COM → INT	0.56	<0.001	Accepted
H5	PEU → ATT	0.64	<0.001	Accepted
H6	PEU → PEN	0.02	<0.05	Accepted
H7	PEN → ATT	0.21	<0.001	Accepted
H8	PEN → INT	0.09	0.11	Rejected
H9	ATT → INT	0.63	<0.001	Accepted
H10	SUB → INT	0.22	<0.001	Accepted
H11	PBC → INT	0.45	<0.001	Accepted
H12	SUB → PEN	0.37	<0.001	Accepted
H13	FLO → ATT	0.38	<0.001	Accepted
H14	FLO → INT	0.19	<0.001	Accepted
H15	HCI → FLO	0.41	<0.001	Accepted
H16	SOI → FLO	0.27	<0.001	Accepted
H17	SOI → ATT	0.56	<0.001	Accepted
H18	ATT → LOY	0.27	<0.001	Accepted
H19	INT → LOY	0.58	<0.001	Accepted
Indirect				
H20	ATT → GEN →INT			Accepted
H21	ATT→ GEN → LOY			Rejected
H22	INT → GEN →LOY			Rejected

Table 5

Mediation analysis results

Fit estimates	APC	ARS	AARS	AVIF	GOF
Model 1, full mediation	0.186	0.668	0.627	2.193	0.675
Model 2	0.247	0.521	0.519	3.534	0.518
Model 3, no mediation	0.298	0.518	0.504	3.872	0.510
Model 4, partial mediation	0.189	0.658	0.636	2.837	0.584
	Model 1, full mediation	Model 2	Model 3, no mediation	Model 4, partial mediation	
R^2					
Attitude	0.68	-	-	0.65	
Continuous intention	0.73	-	-	0.61	
Loyalty	0.59	0.23	0.36	0.53	

6. Discussion and conclusions

6.1. Discussion of findings

The current study aims to identify the main factors that influence the Egyptian gamer's intentions to play online games and their loyalty through the integration of three well-known theories. Our proposed model supposed that perceived relative advantages, compatibility, perceived ease of use, perceived enjoyment, subjective norm, perceived behavioral control, flow experience, social interaction, and attitude are the key antecedents to gamer's intentions to play online games. As well as, perceived enjoyment, flow experience, attitude, and continuous intention to mediate the positive relationship between perceived relative advantages, compatibility, and perceived ease of use, subjective norm, social interaction, and both gamer's continuous intentions to play and their loyalty. The results of data collected from 1,660 respondents show that perceived relative advantages, compatibility, perceived ease of use, perceived enjoyment, subjective norm, perceived behavioral control, flow experience, social interaction and attitude represent the key elements influence Egyptian gamers continuous intentions to play online games and their loyalty.

Regards the gamer's perception of relative advantages and compatibility, previous studies in the innovation diffusion theory confirmed that they act as key direct antecedents of attitudes and continuous intentions. As expected, both factors have a positive significant influence on gamer's intentions to play online games. These results are consistent with the findings of Amaro and Duarte (2015) and Agag and El-Masry (2016a). However, contrary to what was expected, the positive relationship between perceived relative advantages and intentions to play online was not supported. Based on Holmbeck (1997) and Sobel's (1982) recommendations,

Z statistic revealed that gamer's attitude fully mediated the relationship between both relative advantages, compatibility, and gamers intentions to play online games.

For the ease of use and perceived enjoyment, previous studies in the TAM confirmed that they act as key antecedents of attitudes and continuous intentions to play online games. As expected, perceived enjoyment has a direct positive significant influence on gamer's intentions to play online games, which is consistent with previous studies e.g. (Agag & El-Masry, 2016b; Park et al., 2014; Lee and Tsai (2010); Park et al., 2014; Alzahrani et al., 2017)

Based on Holmbeck (1997) and Sobel's (1982) recommendations, Z statistic revealed that attitude fully mediated the relationship between both ease of use and perceived enjoyment and intentions to play online games.

The results also indicated that perceived ease of use and perceived enjoyment are two relevant antecedents of attitude and intention to play an online game. Therefore, the TAM holds true for Egypt (i.e., a culture that is high in uncertainty avoidance, power distance, and masculinity and low in individualism). Prior studies have demonstrated concern regarding the applicability of the TAM in a culture that is high in power distance, uncertainty avoidance, and masculinity (McCoy, Galletta, and King 2007).

Concerning the attitudes, subjective norms, and perceived behavioral control, previous studies in the TPB confirmed that they work as key predictors of continuous intentions. As expected, the three factors have a positive significant influence on gamer's intentions to play online games, which is consistent with those of prior research on the e-commerce (e.g. Lee (2009); Lee and Tsai (2010); Prugsamatz et al. (2010); Chang et al. (2014); Alzahrani et al. (2017). Based on Holmbeck (1997) and Sobel's (1982) recommendations Z statistic revealed that gamers intentions fully mediated the

relationship between attitudes, subjective norms, perceived behavioral control and their loyalty.

Regarding the flow experience, human-computer interaction and social interaction, previous studies confirmed that flow experience and social interaction represent key antecedents of attitudes and continuous intentions to play online games. At the same time, human-computer interaction work as a predictor of flow experience of online gamers. The findings revealed that both attitudes and intentions to play online games are key determinants of gamer are loyalty toward online games. The results of this study are consistent with Agag and El-Masry (2016b). Intentions to play online games are mostly determined by attitude, compatibility, and social interactions.

Finally, the results confirmed the moderating role of gender in the relationship between attitude and gamers intentions to play online games. Thus, it plays an essential role, which helps the marketing managers in online games companies to improve their market segmentation strategies in the future.

6.2.Managerial Implications

The current study constructed based on scarcity of studies, which focused on the predictors of gamers' intentions to play online games, especially in developing countries. This encouraged the authors to identify the factors influencing the Egyptian gamer's intentions to play online games empirically as the literature recommended. Our findings provide some central implications for developers, advertising managers and marketing managers who develop strategic plans in online games firms as well, in different ways as follows.

First, relative advantage and compatibility are key predictors for intentions to play online games. Hence, advertising managers must focus in their advertising campaigns on the advantages of online games compared to offline games on PC's and on the appropriateness of online games to the youth lifestyle, in order to have more profits from loyal customers who have continuous intentions to play online games.

Second, both ease of use and perceived enjoyment are key determinants of intentions to play online games, and consequently gamer's loyalty. Therefore, the online games developers should improve their games designs to be more easy, enjoyable, and attractive to gain more profits through keeping current players and attract new potential players.

Third, the constructs of TPB; attitude, subjective norms, and perceived behavioral control offer great explanation for gamers intentions to play online games. Thus, marketing managers should work on these points in the form of providing some free games to their current players to attract other players as well as providing non-cost games for beginners and offer the game demo to help them to improve their skills to play. All these factors will improve the gamer's intentions to play online games and then build their loyalty.

Fourth, flow experience and social interaction are relevant factors that affect gamers' intentions to play in the online gaming context, as some people have problems to build relations with others, if these games help them to make a new friendship, then they will subscribe to it immediately. As well as, when the game is attractive the player enters into a state of flow and does not need to exit from this status. Therefore, the online games developers should pay more attention to design attractive game interfaces and provide more contact options with other players to keep and obtain new customers.

Finally, the trend of playing online games among women is noticeably increasing according to reports, as well as the results confirmed the moderating role of gender between attitudes and intentions. Therefore, marketing managers should take into account this result when they make market segmentation in their strategic plans to reap more benefits.

6.3.Theoretical Implications

The current work has numerous theoretical implications that contribute to the body of knowledge as follows. It is one of the few studies, which examined the predictors of online gamer's loyalty through integrating three well-known theories in the online gaming context. Our findings revealed that, perceived relative advantages, compatibility, perceived ease of use, perceived enjoyment, subjective norms, perceived behavioral control, flow experience, social interaction, and attitude act as predictors of gamers' intentions to play online games. The results show that innovation diffusion theory explains the user's continuous intentions to play online games as both perceived relative advantages and compatibility represent effective predictors of user's continuous intentions to play, which in turn predict their loyalty. TAM explains the user's continuous intentions to play online games, meanwhile, both perceived ease of use and perceived enjoyment are effective predictors of user's continuous intentions to play, which in turn predict their loyalty. The theory of planned behavior considers a decent investigator of the user's continuous intentions to play, which in turn predict their loyalty through its factors; attitude, subjective norms, perceived behavioral control. The significant role of both flow experience and social interaction to interpret user's continuous intentions to play online games encourage testing the role of Uses and gratifications theory factors to predict the customer's intentions to play online games.

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Gender as a moderator factor shows meaningful findings that opened the direction to moderate other demographic factors in the online gaming context.

6.4.Limitations and Future Research Directions

Despite the contributions of the current study, it has some limitations that provide directions for further research. First, this study has been conducted in the developing countries, so further research may make a comparison between both users from developed and developing countries, which could contribute to the body of knowledge. Second, despite the predictors tested in our proposed model, other factors could be added to this model for further research such as (e.g. achievement, life stress, trust, and satisfaction). The authors believe that the Uses and gratifications theory may make the model more fit, so we proposed to merge it with the other theories to improve our understanding of online gamer's intentions (see, Li et al., 2015). Our proposed model could be applied in other online communities, which adds to the knowledge if it is validated in that communities. The economic status of the respondents such as the ability to pay (cost) has not been taken into account in this study, which may reveal interesting findings, especially since it is an entertainment industry. We concentrate on gender as a moderator factor but other factors could be examined (e.g., age, income, education, habit, and experience). Third, this study did not consider analyzing the data according to the different games. Therefore, future studies should examine the validity of the proposed model on a specific online game would make a worthwhile contribution to the body of knowledge. Finally, our data collected from gamers already playing online games, so it may be interested to make a comparison between online gamers and non- online gamers in two models, which may be open the door to further research

Table 6

Descriptive statistics and normality tests of the constructs in the model

Statistics	Mean	S.D.	Corrected item-total correlation	Skewness	Kurtosis
Perceived relative advantages (RLD)					
Online game has more advantages than traditional game.	4.5	0.83	0.64	-0.45	0.73
Online game is more convenient than traditional game.	4.6	0.78	0.72	-0.23	-0.58
Online game is more efficient than traditional game.	4.1	0.73	0.58	-0.58	0.39
Online game community provides product variety when playing online.	4.5	0.71	0.61	-0.39	0.78
Compatibility (COP)					
Playing online games is compatible with the way I like to participate in the online community (play).	4.8	0.89	0.58	-0.47	0.43
Playing online games fits my lifestyle.	3.9	0.74	0.59	-0.34	0.25
Playing online games fits well with the way I like to engage in the online community.	4.1	0.71	0.67	-0.59	0.58
Perceived ease of use (PEU)					
It is easy for me to become skilful at playing online games.	4.6	0.4	0.69	-0.29	0.47
Learning to play online games is easy for me.	4.8	0.86	0.56	-0.53	-0.53
It is easy to play online games.	4.3	0.82	0.76	-0.27	0.67
Perceived enjoyment (PEN)					
Playing the online game is enjoyable for me.	4.5	0.79	0.74	-0.48	0.38
While playing online games, I experienced pleasure.	4.8	0.83	0.69	-0.34	0.73
Overall, it is fun to play online games.	4.2	0.76	0.54	-0.28	0.46
It is exciting (interesting) to play online games.	4.2	0.80	0.70	-0.62	0.69
Subjective norm (SUB)					
People important to me supported my playing online games.	4.5	0.72	0.68	-0.43	0.56
People who influence my behavior wanted me to play online games instead of any alternative activities.	4.3	0.79	0.62	-0.38	0.48
Most people who are important to me would think that playing online games is a wise idea.	4.6	0.86	0.63	-0.59	-0.50
Perceived behavioral control (PBC)					
I have the knowledge to play online games.	4.8	0.74	0.80	-0.27	0.68
I have the resources to play online games.	4.3	0.75	0.58	-0.34	0.45

I have the ability to play online games.	4.5	0.76	0.68	-0.58	0.76
Flow experience (FLO)					
I feel time passes quickly while playing online games.	4.7	0.89	0.59	-0.39	-0.34
I felt curious while playing online games.	4.6	0.86	0.68	-0.52	0.65
While playing online games, I find something to explore.	4.8	0.81	0.79	-0.30	0.49
While playing online games, I was entirely absorbed.	4.8	0.85	0.65	-0.12	0.57
Human-computer interaction (HCI)					
Online games give me of necessary information on how to play, such as media controls, basic controls, media selection and online help.	4.7	0.81	0.65	-0.26	0.50
The instructions in online games can be read comfortably.	4.5	0.87	0.69	-0.38	-0.49
The instructions in online games advise me properly in each situation.	4.2	0.83	0.70	-0.51	0.69
Social interaction (SOI)					
Playing online games enable me to make friends.	4.6	0.78	0.65	-0.38	0.48
I enjoy meeting the friends I make while playing online games.	4.5	0.74	0.66	-0.29	0.67
Communicating with others makes online games more enjoyable.	4.8	0.70	0.58	-0.37	-0.45
Attitude to play (ATT)					
I think playing online games is good for me.	3.8	0.87	0.61	-0.45	0.32
I think playing online games is a good leisure activity and is a wise idea.	3.9	0.84	0.62	-0.28	0.43
I have a positive opinion of playing online games.	4.5	0.86	0.73	-0.47	0.61
Intention to play (INT)					
I intend to continue playing online games in the future.	4.8	0.78	0.68	-0.23	0.38
I will keep playing online games as regularly as I do now.	4.3	0.77	0.74	-0.34	0.72
I will continue playing online games as much as possible in the future.	4.7	0.71	0.59	-0.68	-0.23
Online gamer loyalty (LOY)					
I will recommend the online games I played with my friends and relatives.	4.9	0.80	0.64	-0.39	0.59
I repeat playing the online games.	4.3	0.84	0.50	-0.27	0.40
I frequently return to the online games that I played before.	4.6	0.86	0.65	-0.19	0.34
I will say positive things about the games I played to others.	4.3	0.91	0.73	-0.54	0.67

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