Predicting Factors Influencing Online Gaming Towards Effective Decision-Making Among Filipinos: A Structural Modeling Approach

Bianca Mercy A. Cinco, Crissen Ann M. Ico, Franz Jmarc M. Tabafunda, Kyla Louise B. Uy, and Yoshiki B. Kurata

Department of Industrial Engineering, Faculty of Engineering, University of Santo Tomas, España Blvd, 1015, Manila, Philippines

ABSTRACT

Online gaming is a popular pastime for people of all ages, with most players using their mobile devices or going online to play with their game consoles. It has been a prospering industry in the Philippines, especially since the beginning of the COVID-19 pandemic. The study aims to identify how online gaming influences Filipino gamers' effective decision-making, incorporating the Theory of Planned Behavior and Behavioral Decision Theory utilizing the structural equation modeling approach. A self-administered survey was conducted in the study and identified variables such as Cognitive Flexibility, Personality, Online Game Strategies, Certainty, Uncertainty, Subjective Norms, Behavioral Intention, and Attitude as significant factors affecting the perceived decision-making among Filipino online game players. Findings may serve as input to gaming developers in software and game development. This paper is the first study to analyze the factors affecting effective decision-making among Filipino online game players.

Keywords: Decision-making, Online gaming, Theory of planned behavior, Behavioral decision theory

INTRODUCTION

Video games are considered mainstream media and one of the most potent influences in the entertainment business today. Online gaming is a growing sector in the Philippines. In terms of game income, the country is ranked 29th in the world, and more than 29.9 million gamers were reported in the country in 2017 [Statista Research Department, 2022]. The proportion of Filipinos aged 25 to 34 who regularly play online games was the greatest across all age groups. Despite having the lowest percentage of everyday online gamers, respondents aged 55 and older still played games daily in roughly 48 percent of cases. [Statista Research Department, 2022]. The video game industry has exploded in popularity, becoming one of the most widely used types of entertainment of dynamic games on new platforms, which are more challenging and entertaining than the ones they replaced are released [Ulloa Jr., 2022].
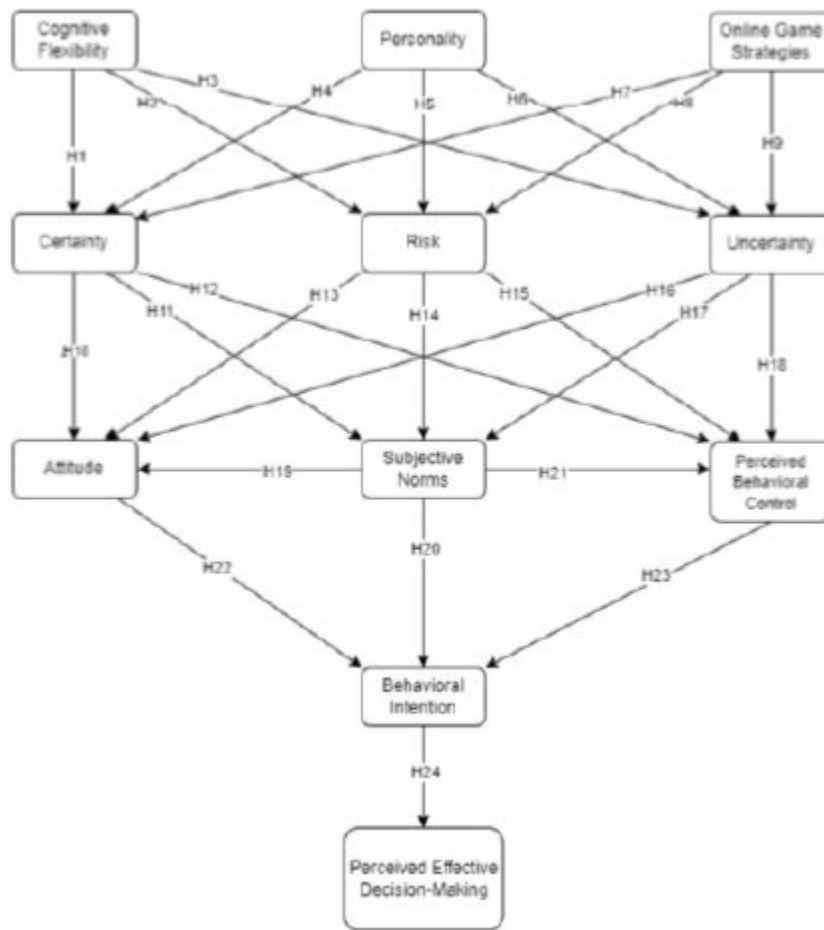
Figure 1: Theoretical framework.

From the basic and straightforward usage of joystick controllers and visuals, the gaming field's structure has wholly altered because of the rapid growth of video gaming. The study provides knowledge associated with a gaming-based learning experience on cognitive learning, specifically in decision-making.

This paper is focused on predicting how online gaming influences the decision-making of Filipino online gamers, incorporating the Theory of Planned Behavior and Behavioral Decision Theory. The conceptual framework revealed the connections between each hypothesis that led to perceived effective decision-making, resulting in 24 hypotheses. Based on literature reviews conducted and the behavioral theories integrated into the study, it was supposed that:

Hypothesis 1 (H1): Cognitive Flexibility has a significant relation towards Certainty that will lead to effective decision making.

Hypothesis 2 (H2): Cognitive Flexibility has a significant relation towards Risk that will lead to effective decision-making.

Hypothesis 3 (H3): Cognitive Flexibility has a significant relation towards Uncertainty that will lead to effective decision-making.

Hypothesis 4 (H4): Personality has a significant relation towards Certainty that will lead to effective decision-making.

Hypothesis 5 (H5): Personality has a significant relation towards Risk that will lead to effective decision-making.

Hypothesis 6 (H6): Personality has a significant relation towards Uncertainty that will lead to effective decision-making.

Hypothesis 7 (H7): Online Game Strategies has a significant relation towards Certainty that will lead to effective decision-making.

Hypothesis 8 (H8): Online Game Strategies has a significant relation towards Risk that will lead to effective decision-making.

Hypothesis 9 (H9): Online Game Strategies has a significant relation towards Uncertainty that will lead to effective decision-making.

Hypothesis 10 (H10): Certainty has a significant relation towards Attitude that will lead to effective decision-making.

Hypothesis 11 (H11): Certainty has a significant relation towards Subjective Norms that will lead to effective decision-making.

Hypothesis 12 (H12): Certainty has a significant relation towards Perceived Behavioral Control that will lead to effective decision-making.

Hypothesis 13 (H13): Risk has a significant relation towards Attitude that will lead to effective decision-making.

Hypothesis 14 (H14): Risk has a significant relation towards Subjective Norms that will lead to effective decision-making.

Hypothesis 15 (H15): Risk has a significant relation towards Perceived behavioral control that will lead to effective decision-making.

Hypothesis 16 (H16): Uncertainty has a significant relation towards Attitude that will lead to effective decision-making.

Hypothesis 17 (H17): Uncertainty has a significant relation towards Subjective Norms that will lead to effective decision-making.

Hypothesis 18 (H18): Uncertainty has a significant relation towards Perceived Behavioral Control that will lead to effective decision-making.

Hypothesis 19 (H19): Subjective Norms has a significant relation towards Attitude that will lead to effective decision–making.

Hypothesis 20 (H20): Subjective Norms has a significant relation towards Behavioral Intention that will lead to effective decision-making.

Hypothesis 21 (H21): Subjective Norms has a significant relation towards Perceived Behavioral Control that will lead to effective decision-making.

Hypothesis 22 (H22): Attitude has a significant relation towards Behavioral Intention that will lead to effective decision-making.

Hypothesis 23 (H23): Perceived Behavioral control has a significant relation towards Behavioral Intention that will lead to effective decision-making.

Hypothesis 24 (H24): Behavioral Intention has a significant relation towards Perceived Effective Decision-Making.

METHODS

The study considered five hundred (500) Filipino online game players. Structural Equation Modeling (SEM) was applied in this study. According to Beran & Violato [2010], SEM is a popular multivariate research technique

Table 1. Profile of Respondents (n = 500).

Characteristic	Category	N	%	Characteristic	Category	N	%
Age	18-24 years old	283	56.60	How many hours per day do you spend playing Online Games?	1-3 hours	184	36.80
	25-31 years old	160	32.00		4-6 hours	205	41.00
	32-38 years old	35	7.00		7-10 hours	68	13.60
	39-45 years old	14	2.80		10-15 hours	30	6.00
	46-60 years old	8	1.60		More than 15 hours	13	2.60
Sex	Male	278	55.60	What kind of gamer are you?	Casual	412	82.40
	Female	201	40.20		Amateur	77	15.40
	Prefer not to say	21	4.20		Professional	11	2.20
Highest Attained Education	Grade School	125	25.00	Do you participate in online multiplayer games?	Yes	464	92.80
	High School	212	42.40		No	36	7.20
	Bachelor's Degree	132	26.40				
	Vocational Education	16	3.20				
	Master's Degree	15	3.00				
Do you play online games?	Yes	500	100	Do you watch video games live streaming?	Yes	375	75.00
	No	0	0		No	125	25.00
What genre of online games do you play most?	RPG	66	13.20	Do you ever have difficulty finding teammates who match your playing style, schedule or fill specific roles?	Yes	221	44.20
	RTS	49	9.80		No	279	55.80
	FPS	137	27.40				
	TPS	33	6.60				
	MOBA	176	35.20				
	MMORPG	39	7.80				

used in analyzing the correlation of variables and latent constructs. [Statistics Solutions, n.d.]. Its application ranges from simple variable connection analysis to advanced measurement equivalence analysis for first and high-order constructs [Beran & Violato, 2010]. SEM was used to determine the final model of the study showing the significant variables and their direct and indirect interactions that influence the perceived effective decision-making of Filipino gamers [Kurata et al., 2022].

RESULTS

The figure below shows the initial SEM model for the study. Several hypotheses were shown to be insignificant in the model. As a result, a new model was created for the final SEM model:

The values for the Incremental Fit Index (IFI), Tucker Lewis Index (TLI), Comparative Fit Index (CFI), Goodness of Fit Index (GFI), and Adjusted Goodness of Fit Index (AGFI) each had parameter estimations that were
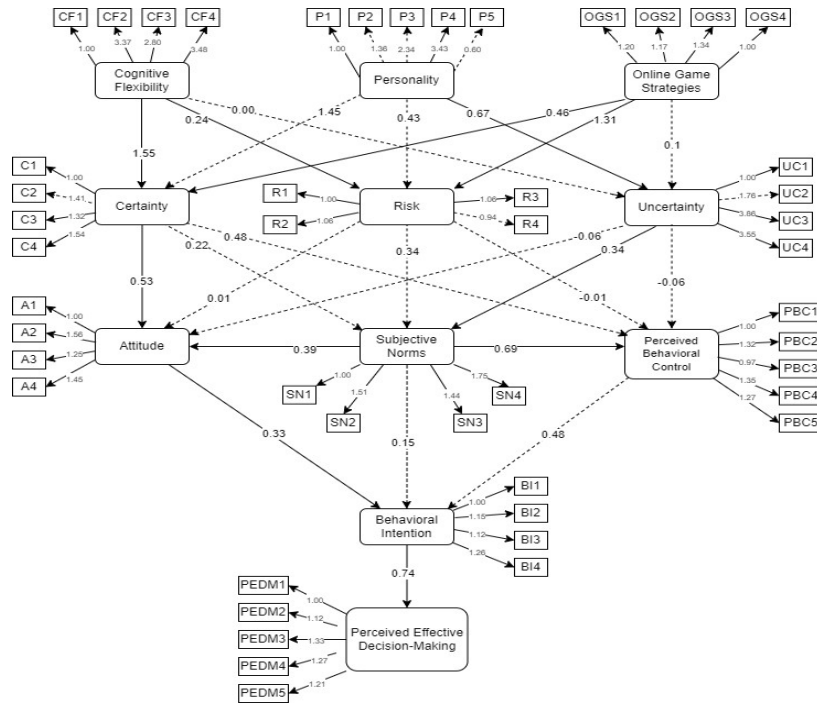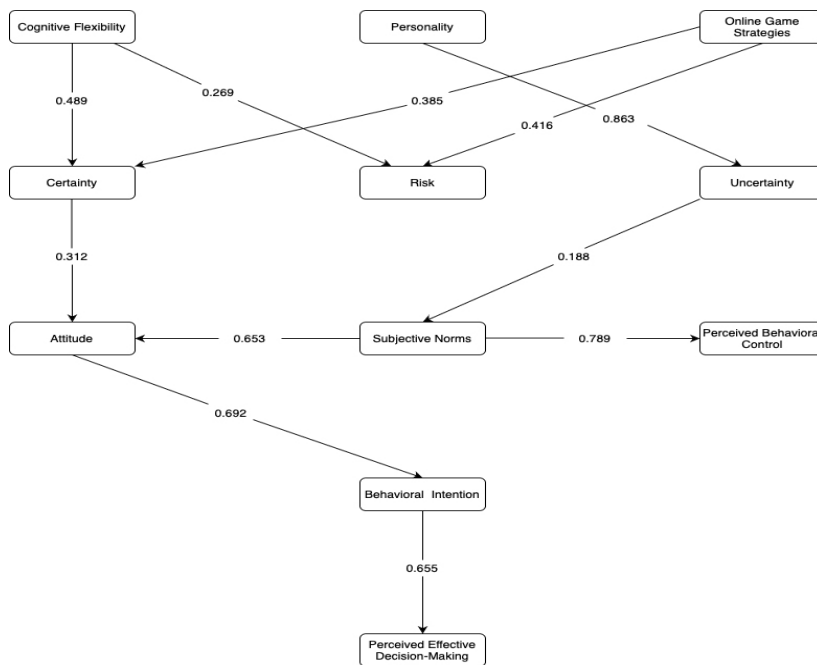
Figure 2: Initial SEM model.

Figure 3: Final SEM model.

higher above the cutoff of 0.80. The Root Mean Square Error of Approximation (RMSEA) parameter estimate of 0.056 was lower than the required minimal level, demonstrating an outstanding model fitness.

Table 2. Model fit indices.

Goodness of Fit Measures	Parameter Estimates	Minimum Cutoff	Suggested by
Incremental Fit Index (IFI)	0.806	>0.80	[Gefen et al., 2000]
Tucker Lewis Index (TLI)	0.789	>0.80	[Gefen et al., 2000]
Comparative Fit index (CFI)	0.804	>0.80	[Gefen et al., 2000]
Goodness of Fit Index (GFI)	0.831	>0.80	[Gefen et al., 2000]
Adjusted Goodness of Fit Index (AGFI)	0.809	>0.80	[Gefen et al., 2000]
Root Mean Square Error of Approximation (RMSEA)	0.056	<0.07	[Steiger, 2007]

SEM results show that Personality is the most significant latent factor influencing Uncertainty (β: 0.863; p = 0.001). When people lack an understanding of the game, they tend to make effective decisions which corresponds to the study of Bloemen et al. [2019], where they stated that Uncertainty also results from activities over time in the areas of reaction to changing and unforeseen circumstances. This implies that a player's personality is one of the most critical parts of figuring out how games may influence players. A game's quality increases with the number of players playing it, reflecting the diversity of the players' knowledge and playing styles, which then influences their decision-making.

Second, Subjective Norms showed a direct relationship to Perceived Behavioral Control (β: 0.789; p = 0.003). The result indicates that Filipino online gamers perceive playing online games can influence their peers to try various online games. Influencers also play a role in influencing a particular gamer to try chosen games. According to Sassine [2017], professional gamers are social influencers, and this perspective brings an immediate connection between celebrity endorsement and social media influencers. It can indicate that although Filipino online gamers perceive that the people they look up to influence them in playing online games, they can still manage to make effective decisions and carry them out.

Third, Attitude directly affects Behavioral Intention (β: 0.692; p = 0.007). According to the Theory of Planned Behavior, a person's attitude reflects their beliefs and thoughts, while the intention is a person's persistence and determination in pursuing a course of action [Mamman et al., 2016; Alzahrani et al., 2017]. From TBP, attitude influences behavioral intention, affecting how people want to carry out their tasks, and that intention directly affects how we behave [Ajzen, 1991]. It can infer that Filipino gamers' attitude reflects their intention on how they play and make decisions in the game.

Fourth, Behavioral Intention significantly impacts Perceived Effective Decision-Making (β:0.655; p = 0.003). Yang [2016] explained that interaction with games and digital games could effectively improve energy knowledge from interactions with different games. Learners might gain positive behavioral intentions and absorb different energy knowledge. According to Reynaldo et al. [2021], video games can improve a person's skills, especially when it comes to decision-making and cognitive skills. Thus, this can

make an impact on intelligence. It is also explained by Reynaldo et al. [2021] that playing games may train the player's brain, and a controlled way is vital for optimal results.

Fifth, Subjective Norms showed a direct relationship to Attitude (β: 0.653; p = 0.002). According to Hahn & Roos [2017], Subjective Norms are the outcome of expectations about others' typical behavior and the desire to conform to them. Online games provide virtual worlds that enhance various social interactions with multiplayer collaboration and competition. Players adhere to group norms in these environments. These pursuits match the group's interests, and the players interact socially [Kaye et al., 2017; Gong et al., 2019]. Playing video games can influence players' attitudes through various mechanisms, including perspective-taking, which allows them to consider events from someone else's perspective [Peña et al., 2018].

Sixth, Cognitive Flexibility directly affects Certainty (β: 0.489; p = 0.002). Cognitive Flexibility is the capacity to adapt to a changing environment, and certainty is the metacognitive assessment of a person's perception of the truth, clarity, or accuracy of a thought, sensation, belief, or attitude [Kim et al., 2022]. According to Baer & Kidd [2022], metacognitive people use their level of certainty to gauge what they know, which further supports the claim in this study that cognitive flexibility affects certainty. In addition, as stated by Wang et al. [2021], people frequently make recurrent errors when unaware of a task's certainty, meaning that one's cognitive flexibility is related to the certainty of the information.

Seventh, Online Game Strategies influencing Risk (β: 0.416; p = 0.001). This result shows online game strategies have a significant relationship with behavioral decision theory; hence online game strategies influence certainty (β: 0.385; p = 0.002). Depending on encounters with opponents, Filipino gamers can swiftly switch gaming from defensive to offensive or in other ways and adjust to making effective choices accordingly. According to Hsieh & Sun [2008], Real Time Strategies (RTS) games provide a suitable environment for exploring ideas. As a result, interesting alternatives can produce beneficial results while playing online games.

Eight, Certainty directly affects Attitude (β: 0.312; p = 0.003). According to Tormala [2016], psychological certainty is essential in deciding how individuals think, judge, feel, and act. The subjective sense of assurance regarding an attitude is called attitude certainty. Online games enable players to collaborate to win engagements, talk to each other to solve issues, and discuss gameplay and latest game successes [Arbeau et al., 2020]. This will reflect on their confidence in their attitudes, making them more inclined to examine them, share them with others, and even persuade others to agree.

Ninth, SEM results show that Cognitive Flexibility is the second to the least effect on Risk (β: 0.269; p = 0.002). According to Dong et al. [2018], Cognitive Flexibility is a task-switching or mental-shifting ability wherein it is the reconfiguration of mental processes by people resources in alternating order. According to Dahabiyeh et al. [2020], risk perception significantly increases when a negative outcome is possible. However, there is a suggestion that individuals look for other ways to reduce the risk when perceived risk

increases, such as carefully considering alternatives. When it comes to online gaming, a high level of risk is associated with a person with behavioral intention, i.e., playing games; they are the person who is more likely to be hesitant to participate.

Lastly, Uncertainty has the least latent factor on Subjective Norms (β: 0.188; p = 0.006). Power et al. [2018] stated that uncertainty also lies in other game elements. However, uncertainty may be regarded as a subjective player experience rather than an objective measure of the game. Another study by Peña et al. [2018] explains that video games allow players to be the protagonist of a story and make consequential decisions. It is also stated that subjective norms could also affect optimism and attitude, influencing an individual's ability and motivation [Sany et al., 2021].

CONCLUSION

Games provide an escape from one's daily routine and an opportunity to have fun and be entertained. Researchers identified that Personality, Subjective Norms, Behavioral Intention, and Attitude are significant factors in effective decision-making. However, Online Game Strategies, Cognitive Flexibility, Uncertainty, and Certainty are additional vital variables that are influenced by the other variables that can influence perceived effective decision-making.

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