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Effects of Co-branding and Hedonic Motivation on Attachment to MOBA characters

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Abstract

Objective of the study: To verify the effects of using co-branding on individuals' attachment to MOBA (Massive Online Battle Arena) mobile games and to analyze the mediating role of hedonic motivation.
Methodology/approach: A quantitative research approach was used to address the issue through a survey technique, with the application of an online questionnaire to test the hypotheses. Data analysis was performed using SmartPLS 4 software to conduct partial least squares structural equation modeling.
Main results: The results indicate a complementary partial mediation of hedonic motivation in the relationship between co-branding and individuals' attachment to MOBA mobile games.
Theoretical/methodological contributions: The research contributes to the literature by analyzing in a highly competitive and current scenario (post-pandemic) that the practice of co-branding is beneficial for brands and generates positive impacts on individuals' attachment. Additionally, the research showed that one of the explanatory mechanisms for increased attachment is hedonic motivation, as it mediated the relationship between co-branding practice and attachment. Another contribution was highlighting that a co-branding campaign with an unknown brand did not receive a good evaluation from the participants in this study.
Relevance/originality: The empirical nature of this study stands out, highlighting constructs such as hedonic motivation, attachment, and co-branding and their relevance in the market scenario of the mobile gaming industry.

Keywords: co-branding, attachment, hedonic motivation, MOBA, mobile games

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Resumo

Efeitos do co-branding e da motivação hedônica no apego a personagens de MOBA

Objetivo do estudo: Verificar os efeitos da utilização do co-branding no apego de indivíduos a jogos *MOBA* (Massive Online Battle Arena) para dispositivos móveis – *mobile games*, e analisar o papel mediador da motivação hedônica.
Metodologia/abordagem: Utilizou-se pesquisa quantitativa para abordar a problemática apresentada através da técnica de levantamento, com aplicação de questionário on-line para testar as hipóteses. Para analisar os dados utilizou-se o software SmartPLS 4 para realizar a modelagem de equação estrutural por mínimos quadrados parciais.
Principais resultados: Os resultados obtidos apresentam uma mediação parcial complementar da motivação hedônica na relação entre co-branding e apego de indivíduos a jogos MOBA para mobile games.
Contribuições teóricas/metodológicas: A pesquisa contribui para a literatura, ao analisar num cenário tão competitivo e tão atual (pós-pandemia), que a prática do co-branding é benéfica para marcas e gera impactos positivos no apego dos indivíduos. Além disso, a pesquisa mostrou que um dos mecanismos explicativos para o aumento do apego é a motivação hedônica, uma vez que ela mediou a relação entre a prática de co-branding e o apego. Outra contribuição foi pontuar que realizar uma campanha de co-branding com uma marca desconhecida não apresentou boa avaliação pelos participantes desta pesquisa.
Relevância/originalidade: Destaca-se o empirismo do presente estudo, ressaltando constructos como motivação hedônica, apego e co-branding e sua relevância no cenário mercadológico da indústria de jogos para dispositivos móveis.

Palavras-chave: co-branding, apego, motivação hedônica, MOBA e mobile games

Introduction

The mobile games market presents a scenario with numerous and promising investment opportunities. In 2024, the mobile gaming market is estimated to generate a revenue of US$98.74 billion globally, and furthermore, the number of users in this segment is expected to reach 1.9 billion by 2027, with an estimated compound annual growth rate (2024-2027) of 6.39%, resulting in a projected market volume of US$118.90 billion by 2027 (Statista, 2024).

Mobile games present various gameplay styles, such as action, adventure, simulation, among others, and between them, the multiplayer online battle arena model, popularly called MOBA (Multiplayer Online Battle Arena), is considered one of the most attractive styles of freemium mobile games. The factors that contribute to the attractiveness and engagement of players with MOBA platforms involve graphics, social interaction, hero system, sound effects,

gameplay (Hamari & Lehdonvirta, 2010; Guo & Barnes, 2007; Qi et al, 2016), as well as emotional and hedonic factors such as fun, pleasure, and excitement (Voss, Spangenberg & Grohmann, 2003).

Marketing tactics such as co-branding have been becoming increasingly common in the MOBA universe with the objective of enhancing the hedonic aspects and the attractiveness of games to the gaming audience. The practice of co-branding involves the agreement between two or more distinct companies, combining their brands, their products, or other active properties to create a separate brand or a new product (Abratt & Motlana, 2002; Washburn, Till & Priluck, 2004). Despite the increase in the use of co-branding by companies, past research involving this practice in mobile games has shown little or almost no evidence of effectiveness.

For example, Li (2018) showed that the use of co-branding with fantasy figures had no main effects on the attitude towards ads and purchase intention, however, when there was congruence between the brand and the fantasy figures, the effect on the attitude towards the ads became significant. In another study, Shen (2021) analyzed the use of co-branding involving product marketing, entertainment, cross-border cooperation, and intellectual property creation. Results showed that co-branding has made a positive contribution to the popularity of MOBA games on Mobile Games platforms.

In order to explore the phenomenon of co-branding more deeply, this research aims to analyze how co-branding practices affect the hedonic processing components of players on these platforms. We focus on attachment to the game, considering that players develop relationships with the characters on these platforms. In line with the study by Qi et al. (2016), we also suggest that hedonic motivation (e.g., fun, pleasure, and excitement, hero systems, and skins) is part of the explanation for how co-branding works. That is, if co-branding makes sense to the player, as the congruence presented by Li (2018), the associations and attachment to the game tend to increase, and this can be explained by hedonic motivation.

This research justifies its relevance by contributing to the theoretical development of co-branding tactical models (Helmig, Huber & Leeflang, 2008; Zuhdi, Rainanto & Apriyani, 2020). Although several studies have investigated co-branding structures and their synergies between brands (Washburn, Till & Priluck, 2000; Helmig, Huber & Leeflang, 2008; Zuhdi, Rainanto & Apriyani, 2020; Górska-Warsewicz, 2024), few have addressed the psychological mechanisms that

can influence the success of these partnerships. This study is innovative by introducing the mechanism of hedonic motivation, offering a new perspective on how the pursuit of pleasure and positive experiences can be a crucial factor for the effectiveness of co-branding tactics. To the best of our knowledge, this is the first research to explore this specific aspect in the context of co-branding.

The manuscript is organized as follows. First, important points will be discussed to understand the mobile games landscape in the digital games industry and the main theories that support the construction of research hypotheses. Then, we describe in detail the methods and techniques used for data collection and analysis. In the results section, we present the descriptive analyses and the analysis and adjustment of the measurement and structural models, followed by the hypothesis testing. Next, we will have the discussion section, where we interpret and contextualize the findings in light of the theoretical framework. Finally, in the concluding remarks section, we summarize the main findings of the study, highlight their practical implications, and suggest directions for future research.

Theoretical Framework

In this section, we first present a brief topic about the mobile games industry landscape. Then, discussions about the three constructs will be presented.

Mobile Games Industry and the MOBA (Massive Online Battle Arena) Subgenre

The mobile games industry has experienced significant growth due to investments in innovation for mobile devices, such as high-speed wireless networks, touchscreens, 3D visual features, and online functionality, which have enhanced the gamers experience (Bose & Yang, 2011). These advances have made it possible for digital games from various genres and subgenres, including action, shooter, and strategy, to be adapted for mobile devices (Rogers, 2012). This study specifically focuses on MOBA games, which belong to the real-time strategy subgenre within the strategy genre and require quick thinking (Qi et al., 2019).

MOBA mobile games, translated as “multiplayer online battle arena for mobile games,” are also referred to as real-time action strategy games, stemming from real-time strategy games

(Qi et al., 2019). Typically, this game model revolves around a confrontation between two teams, where each user controls a character with a specific role within the team; the elements used in the confrontation are made available in a manner that follows the flow of time and space on the scene displayed on the mobile device screen; players have the freedom to formulate their strategies in the way they deem most suitable in order to defeat the opposing team and achieve victory.

Qi et al. (2019) highlight three main characteristics of MOBA games on mobile devices. Firstly, fairness and competitiveness, where these games demand high precision and increase tension, with competitiveness being the driving force behind the rapid growth of the industry. Secondly, real-time confrontation allows for flexible matches lasting between 10 to 40 minutes, each with unique events, which can take place in any environment with network connectivity. The third characteristic is the convenient control system, using a joystick and virtual buttons that require both hands, reducing command errors and improving gameplay. In addition to these characteristics, factors such as graphics, social interaction, hero system, sound effects, and gameplay significantly contribute to the attractiveness of MOBA games.

The mobile games environment and the MOBA subgenre present an ideal setting to investigate the gap in understanding the psychological mechanisms underlying the use of co-branding techniques due to its unique combination of technological, social, and user engagement factors. This context allows for an in-depth investigation of the psychological mechanisms that may contribute to the success of co-branding partnerships.

Co-branding

In the field of marketing, the cross-border cooperation model is identified as Co-branding and occurs when two or more brands deliberately join forces in a marketing context, aiming at one or a set of specific actions to achieve certain objectives, such as the launch of advertising campaigns, new products, and announcements (Grossman, 1997). In this way, the brands cooperate together to avoid potential market competition strains or even to enter a different segment, aiming for joint profit (Geylani, Inman & Hofstede, 2008; Grossman, 1997; Mazodier & Merunka, 2014; Leuthesser, Kohli & Suri, 2003).

The advantages of using Co-branding are not limited to profit alone. The use of Co-branding positively affects consumers' perceptions of the partnered brands (Bengtsson & Servais,

2005), as the act of cooperation involves what Xing and Chalip (2006) refer to as attribute exchange, allowing for this transposition to achieve effective recognition and benefits such as an increase in the evaluation of the partner brands in the eyes of their consumers (Chang, 2008).

In the landscape of the Mobile Games market, Shen (2021) conducted a case study on the marketing strategies used in the game Honor of King by Tencent, identifying four main models, highlighting that cross-border marketing is commonly utilized in the mature stage of the game. Huang (2021), in a similar study, investigated the marketing strategy employed by the game Glory of King, emphasizing four marketing tactics as the most commonly used: brand marketing, competition marketing, live broadcasting, and cross-border marketing.

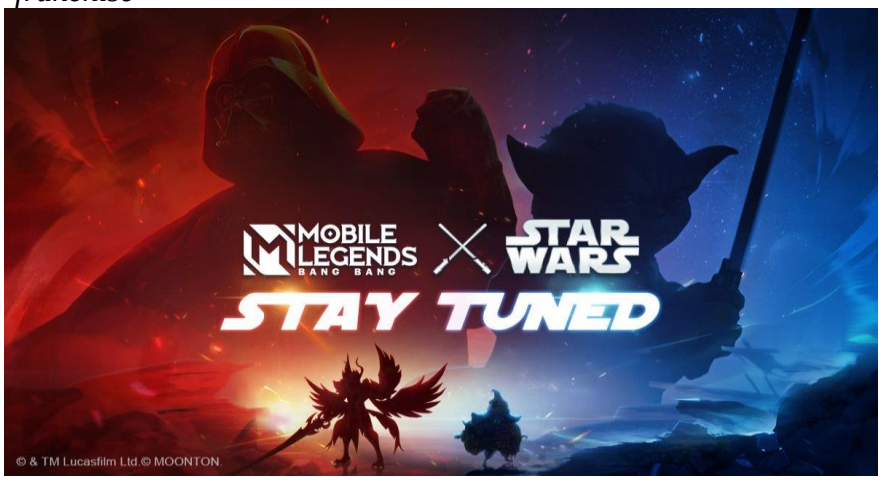
Huang (2021) identifies three models of cross-border marketing: cross-border product, cross-border content, and cross-border channel. The model most relevant to co-branding is cross-border product marketing, which involves creating or adapting products for new markets by combining features from two or more brands (Huang, 2021). In co-branding, this approach is not limited to the efforts of a single company, but rather involves collaboration between brands to develop products that combine their competencies and expand their reach in the consumer market (Huang, 2021).

Nye, Wang, and Chan (2024) investigated how the visual positioning of brands in co-branding advertisements affects luxury perceptions, concluding that vertical positioning enhances consumer attitudes toward luxury more than horizontal positioning. A practical example of this concept in the mobile games market is the partnership of the developer Moonton, announced on April 4, 2021, with the Star Wars franchise to create skins for the game Mobile Legends Bang Bang (MLBB), including iconic characters like Darth Vader and Yoda. This collaboration exemplifies how cross-border content can expand brand reach by leveraging cross-brand platforms (Huang, 2021).

To illustrate the understanding of co-branding actions in the MOBA universe, Figure 1 presents the confirmation and disclosure banner of a type of collaboration (co-branding), posted on the social network X (formerly Twitter) on April 4, 2021. The silhouettes of the two smaller characters belong to the characters from MLBB, and the larger silhouettes in the background belong to the famous characters from the Star Wars franchise, Darth Vader and Master Yoda.

Figure 1

Promotional poster for the collaboration between MLBB and the Star Wars franchise



Case studies in the mobile gaming market (Shen, 2021; Huang, 2021) and research on visual positioning in co-branding advertisements (Nye, Wang, and Chan, 2024) highlight specific tactics and practical examples, such as the collaboration between Moonton and Star Wars (GE Editorial, 2021). However, there is a gap in understanding the underlying psychological mechanisms, such as hedonic motivation, that this study aims to address.

Emotional attachment to game characters

In the field of psychology (Bowlby, 1979), emotional attachment is characterized by a strong bond of affective feelings that occurs between an individual and a specific object. The emotional attachment relationship can occur with a variety of items, such as between individuals (Bowlby, 1979), with places (Rubistein & Parmelee, 1992), with celebrities (Adams-Price & Greene, 1990; Alperstein, 1991), and with pets (Hirschman, 1994). In studies conducted in the field of marketing, the literature demonstrates that emotional attachment occurs between consumers and gifts they receive (Mick & Demoss, 1990), collectible items (Slater, 2000), and even with brands (Schouten & Mcalexander, 1995; Belk, 1988; Fournier, 1988; Malär et al., 2011).

This attachment between an individual and a specific object also occurs between a consumer and a particular brand, with which they maintain an emotionally charged relationship, developing affection, passion, and connection to the brand (Thomson, MacInnis & Park, 2005).

Consumers who have a strong emotional attachment tend to have a favorable attitude toward the brand. This affection, when intense, is often followed by a series of memory formations, filled with affective charges, that connect the individual's self to the object, in this case, the brand (Holmes, 2000; Mikulincer et al., 2001; Thomson, MacInnis & Park, 2005). In the context of the gaming industry (Bopp et al., 2016), people also form attachment relationships with game characters.

For Fullerton (2008), characters can be characterized by their story, by what they say, by what they do, by what they look like, and by what others say about them, being considered "agents that, through their actions, tell a drama" (Fullerton, p. 98, 2008), they are considered excellent elements for generating engagement and experiences rich in emotions (Bopp et al., 2016). Among the concepts present in the literature on communication, media psychology, and gaming experience that depict the attachment relationship between players and characters, Cohen (2001) presents the concept of identification.

According to the author (Cohen, 2001), identification consists of the condition in which a player imagines themselves as the character, seeing their own self and the character's self as one. Therefore, the individual develops a sense of identification with the character that most resembles them (Cohen, 2001), or when the person desires to develop their characteristics in order to approach those of the character, being portrayed as a wishful identification (Hoffner & Buchanan, 2005).

Bopp et al. (2016) conducted an exploratory study aiming to identify the range of experiential emotions that players associate with game characters and identified seven distinct forms of attachment, which vary between attachment focused on functional values and attachment focused on emotional values. As previously mentioned (Huang, 2021), in cross-border cooperation marketing, it is necessary for two companies to work together in creating a new product that encompasses characteristics of both parties.

Despite the concepts presented in previous research, few studies have been conducted to identify the effects that co-branding exerts on attachment to characters in MOBA games. Therefore, we expect that when co-branding tactics are used, MOBA players' attachment to characters will be strengthened. Thus, we propose the first hypothesis:

H1. *Co-branding in the creation of skins has a positive effect on character attachment in Mobile Games.*

Hedonic Motivation

Hedonic motivation is one aspect of consumption that concerns the multisensory, emotional, and imaginative characteristics provided by the use of a product (Hirschman & Holbrook, 1982). In hedonic consumption, the act of consuming the product is not limited to notions of concrete reality but expands to the imaginary, to what the consumer subjectively envisions and desires beyond lived reality (Hirschman & Holbrook, 1982).

Hirschman and Holbrook (1982) conducted a study on the topic of hedonic consumption and investigated four domains related to it: mental constructs, product classes, product usage, and individual differences. Mental constructs are related to how emotions influence the consumer's decision-making process, emphasizing that the consumer has the capacity to add subjective values that go beyond the concrete value of the product, resulting in the acquisition of the product due to this imaginary connection, or simply due to the desire for sensory-emotional stimulation (Hirschman & Holbrook, 1982).

The product classes in consumer behavior research, from a hedonic perspective (Hirschman & Holbrook, 1982), depict the consumption of products such as movies, concerts, theater performances, and novels, which can evoke fantasies in the consumer's mind and satisfy their sensory-emotional needs due to their engaging plots. The product usage refers to the psychological experiences encountered by the consumer during the use of the product, exemplified by the experiences felt during soccer matches or theater performances (Hirschman & Holbrook, 1982). Individual differences highlight that people have varied perceptions of each product according to the values, upbringing, and education present in their social groups since birth (Hirschman & Holbrook, 1982).

In the context of attitudinal studies, consumer behavior is characterized by hedonic and utilitarian aspects, with the utilitarian aspect referring to the functionality of the product and the hedonic to the emotion associated with consumption (Ahtola, 1985). Recent research has explored hedonic motivation in different domains, such as its influence on the acceptance of autonomous vehicles (Zefreh, Edries & Esztergár-Kiss, 2023), purchase intention in e-commerce (Fülop, Topor

& Căpușneanu, 2023), and its role in a TikTok adoption model in higher education (Deng & Yu, 2023). In the realm of digital games, studies have addressed hedonic motivation for game-based student response systems (Palos-Sanchez & Saura, 2024) and hedonic and eudaimonic motivations in games (Possler, Daneels & Bowman, 2024).

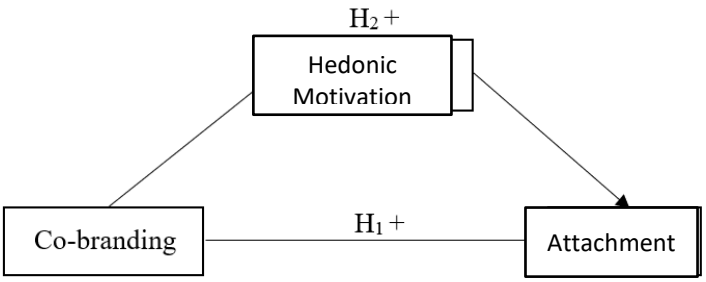
It is evident that hedonic motivation, despite being a construct highlighted in recent research, has not had its role investigated in the proposed relationship between co-branding and attachment, therefore, based on the studies presented, hedonic motivation may act as a mediating mechanism in the relationship between co-branding and attachment, leading to the following hypothesis:

H2. *Hedonic motivation positively mediates the relationship between co-branding and player attachment in MOBA games for mobile games.*

The relationships of the presented hypotheses are illustrated through the theoretical framework outlined in Figure 2. This figure provides a visual representation of the interactions and dependencies among the studied variables, facilitating the understanding of the theoretical connections and propositions that underpin this study.

Figure 2

Theoretical Framework for Co-branding in Attachment



Methodological Procedures

With the characteristics of applied research, the present study aimed to provide insights into the use of co-branding and the generation of key knowledge for practical application in solving specific problems and local interests (Prodanov & Freitas, 2013). The intention was to understand,

record, and describe the effects that the use of co-branding produces, from a behavioral perspective, on emotional attachment, with hedonic motivation as a mediating variable in this relationship. Therefore, the research is classified as descriptive, with a cross-sectional cut.

We used a survey method (Malhotra, 2012) for data collection, which included 22 items with a Likert scale, where respondents were required to answer the items by marking a number between 1 and 7, with 1 meaning "Strongly Disagree" and 7 meaning "Strongly Agree." In addition to the model variables, data regarding four socioeconomic questions were collected at the end of the questionnaire. The constitutive definitions (CD) and the operational definitions (OD) of the measurement scales are presented in Table 1:

Table 1

Constitutive Definitions and Operational Definitions of the Constructs

Construct	CD	OD
Co-branding	It occurs when two or more brands come together purposefully in a marketing context, such as in the launch of advertising campaigns, new product launches, and advertisements (Grossman, 1997).	1 - I admire when two brands announce that they will collaborate to create a new skin.
		2 - I get excited when two brands announce that they will collaborate to create a new skin.
		3 - I appreciate when two brands announce that they will collaborate to create a new skin.
		4 - I sympathize to the idea of a mobile game company working with another brand to create an exclusive skin.
		5 - I find it interesting when a mobile game company announces that it will partner with a company I am not familiar with.
		6 - I find it interesting when a mobile game company announces that it will partner with a company I know.
Attachment	Emotional attachment is characterized by a rich connection of affective feelings that occurs between an individual and a specific object (Bowlby, 1979).	1 - I become passionate about the character that gets a new skin from a collaboration between brands.
		2 - My esteem for the character increases when I see the game creating a new skin for him.
		3 - I come to like a character more when he receives a collaboration skin.
Hedonic Motivation	Hedonic motivation is one of the aspects of consumption that pertains to the multisensory, emotive, and fanciful characteristics provided in the use of a product (Hirschman & Holbrook, 1982).	1 - The design traits of the skin should be fun.
		2 - The design traits of the skin should be exciting.
		3 - The design traits of the skin should be visually pleasing.
		4 - The design traits of the skin should be thrilling.
		5 - The design traits of the skin should be enjoyable.
		6 - This collaboration should present a fun relationship.
		7 - This collaboration should present an exciting relationship.
		8 - This collaboration should present a pleasurable relationship.
		9 - This collaboration should present an emotional relationship.
		10 - This collaboration should present a pleasant relationship.

Results

In the following sections, we present the descriptive analyses and characteristics of the sample, measurement model analyses, structural model analysis, and finally, hypothesis testing.

Descriptive Analyses and Sample Characteristics

During the month of December 2022, a total of 108 respondents participated in the online survey. To verify whether the sample distribution exhibited normality, the Kolmogorov-Smirnov and Shapiro-Wilk tests were conducted, as shown in Table 2.

Table 2

Coefficients of the Normality Tests of the Collected Sample

	Kolmogorov-Smirnov			Shapiro=Wilk		
	Statistics	**df**	**Sig.**	**Statistics**	**df**	**Sig.**
Attachment (APG)	0,139	108	0,000	0,896	108	0,000
Hed_Motivation (MH)	0,226	108	0,000	0,727	108	0,000
Co-branding (CRBND)	0,168	108	0,000	0,855	108	0,000

The Kolmogorov-Smirnov and Shapiro-Wilk tests compare the sample scores with a normal distribution, indicating normality when the p-value is greater than 0.05 and non-normality when less than 0.05 (Field, 2009, p.112). In Table 2, the scores for Attachment, Hed_Motivation, and Co-Branding (D(108) = 0.13; 0.22; 0.16, respectively, all with $p < 0.001$) revealed a significantly non-normal distribution. After identifying non-normality, the presence of outliers was checked using a box-and-whisker plot. The Attachment variable did not show outliers, while Co-Branding and Hedc_Motivation had nine outliers. It was decided to exclude these cases due to uncertainty about the respondents' commitment, resulting in 99 cases for analysis in the structural equation modeling (Field, 2009, p.97).

To assess the presence of common method bias, Harman's single-factor test was conducted. This technique involves performing a principal component analysis without rotation, including all the study variables. The criterion used to identify common method bias is that a single factor should not explain a substantial proportion (more than 50%) of the total variance (Podsakoff et al., 2003). The result obtained in the test explained only 38% of the variance, suggesting that common

method bias is not significant. Next, through the sociodemographic data, it was observed that the participants had an average age (M = 26.36, SD = 7.45). The majority of respondents were male (57.60%), with 37.40% female and 5% other.

In studies of human behavior, the data obtained often do not follow a normal distribution or are scarce, and there is little theoretical support (Ringle, Silva & Bido, 2014). In these situations, it is recommended to use partial least squares structural equation modeling (PLS-SEM) (Hair, Sarstedt, Ringle & Mena, 2012). In PLS-SEM, the correlations between latent and observed variables are measured (measurement model), followed by linear regressions between latent variables (structural model), allowing the analysis of complex models with limited data (Hair et al., 2012).

Measurement model analysis

Initially, the process of analyzing the results occurs in the measurement model, and since it involves a reflective measurement scale, we will analyze the results obtained in composite reliability, convergent validity, indicator reliability, and discriminant validity (Nascimento & Macedo, 2016). To verify whether the composite validity is satisfactory, we used Cronbach's Alpha value as a criterion. The reported values for Cronbach's Alpha (0.838, 0.820, 0.865 for APG, CBRND, and MH, respectively) are greater than 0.6, allowing us to claim the existence of satisfactory levels of internal consistency in the latent variables (Bagozzi & Yi, 1988; Nascimento & Macedo, 2016).

To obtain the reliability value of the indicators, we squared their loadings. Additionally, descriptive analyses of the variables of interest, including co-branding, hedonic motivation, and attachment, were conducted. In Table 3, we report the items that comprise their loadings, their respective reliabilities, and the descriptive analyses of the sample.

Table 3

Descriptive Statistics and Reliability Indicators of the Observed Variables

Construct	Mean	SD	Skewness	Kurstosis	Alpha	Items	Loadings	Reliability
CBRND	5,746	1,154	-0,882	-0,183	0,820	CBRND_1	0,870	0,757
						CBRND_2	0,854	0,729
						CBRND_3	0,844	0,712
						CBRND_4	0,754	0,569
						CBRND_5	0,231	0,053
						CBRND_6	0,730	0,533
MH	6,273	0,773	-0,905	-0,176	0,865	MH_1	0,637	0,406
						MH_2	0,737	0,543
						MH_3	0,482	0,232
						MH_4	0,720	0,518
						MH_5	0,509	0,259
						MH_6	0,630	0,397
						MH_7	0,767	0,588
						MH_8	0,851	0,724
						MH_9	0,676	0,457
						MH_10	0,683	0,466
APG	5,303	1,528	-0,768	-0,063	0,838	APG_1	0,837	0,701
						APG_2	0,894	0,799
						APG_3	0,874	0,764

We found that not all indicators exhibited acceptable reliability values, which should be close to 0.7 for confirmatory studies (Hulland, 1999). The item "CBRND_5" was removed due to a score of 0.053, and the items "MH_1," "MH_3," "MH_5," "MH_6," and "MH_9" were also removed for having values well below 0.7.

In verifying convergent validity, the average variance extracted (AVE) value of each latent variable was used as the criterion. All AVE values (0.755, 0.662, 0.636 for APG, CBRND, and MH, respectively) presented, after the removal of the observed variables, showed scores above the threshold of 0.5 (Bagozzi & Yi, 1998), thus we can conclude that convergent validity was achieved. To identify the discriminant validity of the observed variables, the values resulting from the calculation of the square root of the AVE of each latent variable were used (Nascimento & Macedo, 2016). For this validity to be met, the square root of the AVE must be greater than the correlation coefficients between the latent variables (Fornell & Larcker, 1981). The results obtained were: 0.87 for the APG variable, 0.81 for the CBRND variable, and 0.80 for the MH variable. All values are above 0.70, indicating excellent discriminant validity and demonstrating that the model has the ability to reliably represent the latent constructs.

Assessment of the structural model

After completing the adjustment phase in the measurement model, we proceed to the evaluation phase of the structural model. In this phase, the evaluation of collinearity (VIF values), the significance of the path coefficients, the analysis of the coefficients of determination (R^2), the predictive relevance scores (Q^2), the classification of effect size (f^2), and the sizes of the effect q^2 will be conducted. One criterion used to measure collinearity indices, for reasons of response pattern and practicality, is the variance inflation factor (VIF) (Hair et al., 2014). Next, Table 4 presents the values generated from the output of SmartPLS 4 after performing the PLS-SEM algorithm calculation:

Table 4

VIF values of the observed variables in the proposed model

VIF – Variance Inflation Factor					
MH_2	1,716	**CBRND_1**	2,587	**APG_1**	1,738
MH_4	2,056	**CBRND_2**	2,758	**APG_2**	2,154
MH_7	2,425	**CBRND_3**	2,548	**APG_3**	2,171
MH_8	3,659	**CBRND_4**	1,703		
MH_10	2,310	**CBRND_6**	1,564		

In the composition of PLS-SEM, when the results show a VIF score equal to or greater than 5, it indicates the presence of potential multicollinearity problems (Hair et al., 2014). According to Hair et al. (2014), when the score of the indicators points to VIF values equal to or greater than 5, it means that 80% of its variance is estimated by the other indicators associated with the same construct. By examining the values presented in Table 4, we can confirm that the values meet the collinearity tolerance criterion, where the VIF values need to be less than 0.5 (Hair et al., 2014).

Continuing with the analysis, since PLS-SEM handles linear regressions and correlations, we need to examine the relationships of the path coefficients. To verify the significance of the coefficients, it is necessary to analyze the standard error obtained through the bootstrapping technique (Hair et al., 2014; Ringle et al., 2014). We chose to work with the p-values to assess the levels of significance and assumed a significance level of 5% for analyzing the constructs of this research (Hair et al., 2014). The scores presented in the calculation generated by SmartPLS 4 for

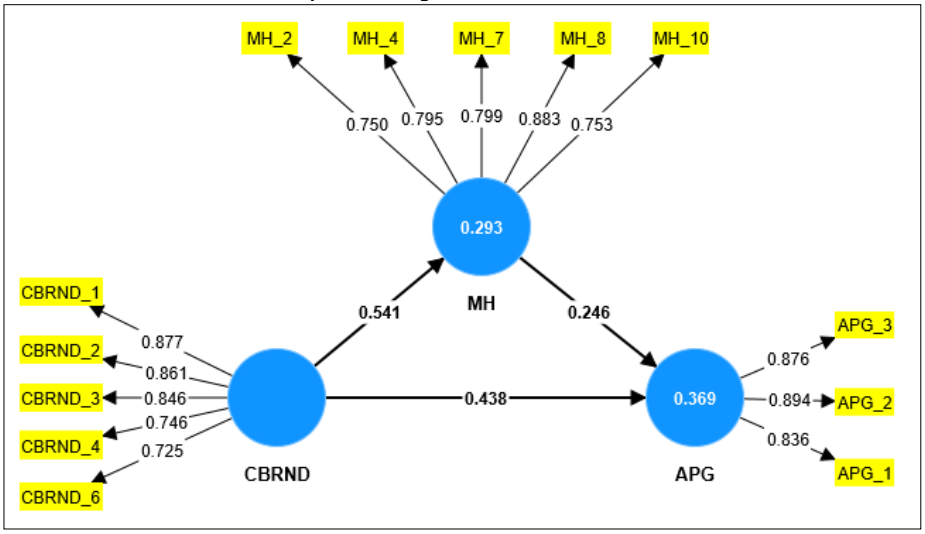
the p-value in each coefficient of the model paths (0.0001, 0.0001, and 0.025 for CBRND -> APG, CBRND -> MH, and MH -> APG, respectively) were less than 5% ($p < 0.05$), therefore we assert that the effects of the path coefficients are significant.

The measure used to evaluate the structural model was the Pearson coefficient (R^2). This factor is a measure of the predictive power of the proposed model and is represented as the squared correlation between the actual and predicted values of a specific endogenous construct (Hair et al., 2014). The R^2 values range from 0 to 1, and the higher the values, the greater the predictive accuracy is considered (Hair et al., 2014). As an analysis criterion, we used the recommendations by Hair et al. (2011) and Henseler et al. (2009), in which, for the marketing field involving studies in social and behavioral sciences, R^2 coefficients with values of 0.75, 0.50, or 0.25 for endogenous latent variables can be described, respectively, as substantial, moderate, or weak predictive explanation.

Based on Figure 3, it is possible to assess the degree of explanation of the variance of the endogenous variable APG, which was approximately 0.37, allowing us to infer that the latent variables, Co-branding (CBRND) and Hedonic Motivation (MH), explained, in a moderate way (Hair et al., 2014), approximately 37% of the variance of the latent variable Attachment (APG), while the latent variable Co-branding (CBRND) alone was responsible for explaining, in a moderate way, about 29% of the variance of the latent variable Hedonic Motivation (MH).

Figure 3

Structural Evaluation of the Proposed Model



Note: **SRMR**: 0,084 **χ^2/df**: 170,883 **NFI**: 0,780

The values of R^2 are crucial in model analysis, as they allow for the evaluation of the impact of exogenous constructs by measuring changes in R^2 when a construct is omitted, which is known as the effect size f^2 (Hair et al., 2014). SmartPLS 4 provides the f^2 values directly in its PLS-SEM modeling results. To classify the effect (f^2), the criteria of 0.02, 0.15, and 0.35 are used for small, medium, and large effects, respectively. The obtained values were $f^2 = 0.215$ for the relationship between the exogenous construct CBRND and the endogenous construct APG, indicating a medium effect; $f^2 = 0.414$ for the relationship between CBRND and MH, indicating a large effect; and $f^2 = 0.068$ for the relationship between MH and APG, indicating a small effect.

In addition to the analysis of Pearson correlation coefficients, the predictive relevance was also assessed using the Q^2 of Stone-Geisser (Geisser, 1974; Stone, 1974), which measures the predictive capacity of the model outside the collected sample (Hair et al., 2014). For the model to demonstrate predictive relevance, the Q^2 values for the endogenous latent variables must be greater than zero. In SmartPLS 4, the obtained Q^2 values were 0.295 for the construct APG and 0.251 for the construct MH, both indicating positive predictive relevance. Predictive relevance is classified as small, medium, or large, based on Q^2 values of 0.02, 0.15, and 0.35, respectively (Hair et al.,

2014). With these results, the path model demonstrates a medium predictive quality between the endogenous and exogenous constructs.

The fit values of the estimated model indicate a good fit. The SRMR of 0.08 is slightly below the threshold of 0.10, suggesting that the differences between the observed and predicted correlations are minimal. The NFI index presented a marginally satisfactory value of 0.78, as it is below the criterion of 0.9. The chi-square value was 170.883, with 95 degrees of freedom, resulting in a χ^2/df ratio of approximately 1.80, which is satisfactory as it falls within the acceptable limit of ≤ 3.0. These results, taken together, suggest that the proposed theoretical model has a generally satisfactory fit, although there is room for improvement.

Hypothesis Testing

Once the evaluation of the structural quality of the model was completed, we proceeded to interpret the path coefficients represented by beta (β) from the simple linear regressions and validate the presented hypotheses (Ringle et al., 2014). Below, Table 5 presents the results obtained from the mediation analysis of the proposed model:

Table 5

Results of the mediation analysis of the proposed model

Total Effect (CBRND ->APG)					
Beta Coefficient (β)		**t-Statistic**		**p-value**	
0,571		7,173		0,001	
Direct Effect (CBRND ->APG)					
Beta Coefficient (β)		**t-Statistic**		**p-value**	
0,438		4,720		0,001	
Indirect Effect of CBRND on APG					
Beta Coefficient (β)	**Standard Deviation**	**t-Statistic**	**p-value**	**95% Confidence Interval Percentile Bootstrapping**	
				Lower(2,5%)	**Upper (97,5%)**
0,133	0,065	2,034	0,042	0,012	0,268

H1 sought to evaluate whether the use of Co-branding generates a positive effect on attachment to characters in MOBA genre Mobile Games. The results obtained from the structural

equation modeling through partial least squares using SmartPLS 4 revealed that the use of Co-branding had a significant and positive impact on the direct relationship with Attachment (β = 0.438, t = 4.720, $p < 0.001$). H2 aimed to verify whether Hedonic Motivation positively mediates the relationship between co-branding and attachment to characters in MOBA games for Mobile Games. The results revealed a significant indirect effect of Co-branding on Attachment through Hedonic Motivation (H4: β = 0.133, t = 2.034, $p < 0.05$). The total effect of Co-branding on Attachment was significant (β = 0.571, t = 7.173, $p < 0.001$), and after removing the mediating effect, the effect of Co-branding on Attachment remained significant (β = 0.438, t = 4.720, $p < 0.001$). This result represents a partial mediation of Hedonic Motivation in the relationship between Co-branding and Attachment in the proposed structural model; therefore, H1 and H2 were supported.

To reinforce the results found, we conducted the Sobel test, which revealed a Z-score of 3.940 for the indirect effect of co-branding on attachment through Hedonic Motivation ($p < 0.05$). These results confirm that Hedonic Motivation plays a significant role in the relationship between co-branding and attachment, reinforcing the proposed mediation hypothesis.

General Discussions and Conclusions

The objective of this research was to identify how the use of co-branding in the creation of skins impacts attachment to characters originating from the MOBA games themselves for Mobile Games, with hedonic motivation serving as a mediator of the relationship.

The results obtained in the model scores validated H1 and H2; therefore, the use of co-branding campaigns in MOBA for mobile games positively impacts individuals' attachment to the characters that receive the new skins, in such a way that aspects of hedonic motivation, such as fun, excitement, pleasure, and emotion, as described by Voss et al. (2003), are factors that mediate this relationship. Thus, we can infer that individuals tend to feel more attached to a MOBA game for Mobile Games when subjected to a collaboration between brands in which aspects like fun, excitement, pleasure, and emotion are present in the interaction.

Theoretical Contributions

The findings obtained in this research provide relevant theoretical contributions to the literature on the addressed topic. Firstly, in the co-branding literature, it can be argued that the measurement of attachment adapted to the world of MOBA games generates relevant insights, as it shows that part of the emotional attachment effect to the originating character can be transferred to the destination brand through cross-border collaboration (Xing & Chalip, 2006; Schouten & McAlexander, 1995; Belk, 1988; Fournier, 1988; Malär et al., 2011).

In relation to hedonic motivation, the literature depicts how a mental construct has a direct connection with how emotions impact the consumer's decision-making process (Hirschman & Holbrook, 1982). Our results show that the mechanism of hedonic motivation can partially explain how co-branding strategies can function effectively. Aspects such as pleasure and positive experiences, induced by co-branding actions that make sense to consumers, can be a determining factor in the success of implementing co-branding actions not only in the world of online games (Li, 2018; Shen, 2021; Huang, 2021). Although we have only tested emotional attachment, the literature shows a strong correlation between attachment and consumer attitudes (Ilicic & Webster, 2011; Rodríguez-Torrico et al., 2019; Chen & Yang, 2023).

One could argue that attachment did not show complete mediation, but rather partial mediation. This is in line with research such as Park et al. (2007), which shows that brand stimuli (e.g., brand authenticity – Oh, Prado, Frizzo, and Korelo, 2019) are processed through three pathways: cognitive, affective, and symbolic, and that these would be the mechanisms that generate attachment to brands. Our research tested the affective component, contributing to the literature on co-branding and attachment.

Managerial Contributions

The present research also contributed with managerial insights. The practice of collaboration between brands proves to be a highly effective marketing tactic in the MOBA game industry for mobile games; however, as important as knowing that a tactic is good is understanding the best way to apply it to one’s own business and how it will resonate with consumers. Therefore, this study helps marketing managers to recognize that the practice of co-branding directly affects attachment to the characters originating from the MOBA game for mobile games. Moreover,

hedonic aspects should be taken into account by designers working on the graphic creation of skins. Another important point is that marketing managers should not engage in a collaboration campaign with just any franchise; it is crucial to conduct a survey with the game's users to find out which franchises they would like to see the MOBA game collaborating with, considering the most voted options and those that fit within the budget.

Limitations and Suggestions for Future Research

Some limitations arose during the present research and ultimately affected the robustness of the results. The first limitation was the number of indicators used to measure the Attachment construct, where three indicators were employed to measure the construct; however, Bido, Silva, Souza, and Godoy (2009) recommend using a minimum of five indicators per latent variable. Another limitation was the number of responses collected. Although SmartPLS operates using the PLS-SEM technique and has exceeded the minimum number of 68 responses collected, to ensure minimum validity in the data analysis, Ringle et al. (2014) suggest using double or triple the minimum number of cases necessary for the model to achieve greater consistency.

Another limitation was the exclusion of the indicator representing the statement "I find it interesting when a mobile game company announces that it will partner with a company I am not familiar with." Co-branding occurs when two or more brands come together, in a marketing context, for the launch of advertising campaigns, announcements, or the creation of new products (Grossman, 1997); however, in the context of MOBA games for mobile games, it was possible to identify that engaging in co-branding to create skins with a little-known or even unknown franchise was not well received by the survey participants, which reinforces the concepts presented by Xing and Chalip (2006) regarding the exchange of attributes.

To measure the Hedonic Motivation construct, indicators were taken from the hedonic dimension scale by Voss et al. (2003); however, two perspectives were evaluated. The first aimed to assess aspects of hedonic motivation related to the visuals of skins in MOBA games resulting from co-branding actions between companies, while the second perspective sought to investigate the hedonic motivation related to collaboration between a MOBA mobile gaming company and another unspecified brand. With the results obtained from the data collection, an attempt was made to verify whether the latent variable Hedonic Motivation could be considered a second-order latent

variable, formed by two first-order variables. The attempt did not find statistical validation, as it did not meet the criteria for discriminant validity and reliability of the indicators (Hair et al., 2014).

Although no evidence was found for a possible second-order latent variable, it was possible to verify that both the visual aspects of the new skin, resulting from co-branding, and the hedonic aspects of the collaboration between a mobile game company in the MOBA genre and another brand are important and considered in the individuals' evaluations. Future research could explore in more detail the second-order modeling components of hedonic motivation.

Another limitation relates to the size of the sample collected. Due to resource constraints and difficulties in obtaining responses from participants, the sample was smaller than 10 respondents per item (Hair et al. 2014). Although the obtained results provide valuable insights, a larger sample could enhance the robustness of the conclusions and the generalization of the findings. It is recommended that future studies seek to increase the sample size to validate and expand the results presented here. However, despite such limitations, this research was able to achieve its main objective and provide theoretical and managerial contributions, both for the academic realm and the market context.

Future research can be conducted to further explore the perceptions provided by this study. The present study aimed to verify the effects of co-branding on attachment in MOBA games for mobile games. A possible extension could involve using experimental research methods instead of questionnaires, subjecting participants to evaluate posters of fictitious collaboration campaigns, to assess whether a collaboration campaign with an unknown or lesser-known company has lesser impacts than one with a well-known franchise, and also to investigate if the skin design acts as a moderating variable. Another valid suggestion would be to apply a similar study to other genres of mobile games and examine whether the effects are similar or present any particularities not anticipated in this study.

This study focused on the specific context of MOBA games and mobile games, with empirical findings limited to this setting. Although this limitation exists, the study offers a significant contribution by exploring co-branding in this particular environment. To overcome this restriction, we recommend that future research investigate these findings in different market contexts. This will enhance the understanding of the effectiveness of co-branding across various segments of the gaming industry. It is essential to consider the context of MOBA games and mobile

games as part of the methodological process, encouraging new investigations in other platforms and markets.

Another fundamental suggestion for future research could investigate the effects of the independent and dependent variables analyzed in the present manuscript on the dependent variable Purchase Intention and Purchase. This investigation is crucial, as only purchase behavior can be directly associated with revenue, providing a deeper understanding of how the studied factors influence consumers' purchasing decisions. Understanding this relationship can offer practical insights into more effective marketing tactics that not only generate engagement but also directly drive sales and revenue for companies.

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Authors' contribution

Contribution	Sedovim, V. M. B. N.	Korelo, J. C.
Conceptualization	X	X
Methodology	X	X
Software	X	X
Validation	X	X
Formal analysis	X	X
Investigation	X	X
Resources	X	X
Data Curation	X	X
Writing - Original Draft	X	X
Writing - Review & Editing	X	X
Visualization	X	X
Supervision	X	X
Project administration	X	X
Funding acquisition		

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