

# Perceived Values, Customer Engagement, and Collective Efficacy with C-A-C on Group Buying App's Purchase Intention

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To Link this Article: <http://dx.doi.org/10.6007/IJAROSS/v14-i9/22717>

DOI:10.6007/IJAROSS/v14-i9/22717

**Published Date:** 26 September 2024

## Abstract

The usage of group buying apps in mobile commerce marketing has experienced a significant increase on a global scale. Many enterprises recognize these apps' economic value and social benefits and consider them a crucial channel for online marketing and brand-building. Consequently, investigating consumers' purchase intention on group buying apps has arisen as a crucial aspect of the study aimed at promoting the advancement of online marketing. This study investigates the correlation between perceived value and purchase intention by integrating the Cognition-Affect-Action (CAC) model and perceived value theory. Furthermore, it tests the mediating impact of customer engagement and the moderating influence of collective efficacy. This study collected data from 420 Chinese Millennials through purposive sampling, and the proposed framework underwent assessment through the application of partial least squares structural equation modeling (PLS-SEM). The results of the analysis yielded three significant findings. Except for adventure, perceived values and customer engagement have positively impacted the group-buying app's purchase intention. Secondly, the results demonstrated that the connection between perceived values and purchase intention was mediated by customer engagement. Most relationships between perceived values and customer engagement were supported, except for monetary value, and customer engagement exhibited the most decisive influence. Thirdly, the moderation analysis revealed that collective efficacy positively influenced the proposed relationships. The current study has identified a previously overlooked connection in the existing literature by demonstrating the mediating effect of customer engagement in linking perceived value and purchase intention, while highlighting the significance of collective efficacy as a moderating factor. This study provides pertinent insights for stakeholders regarding users' expectations of a specific OGB app. Firstly, to appeal to potential purchasers, OGB merchants should offer many benefits associated with OGB shopping. Secondly, to effectively interact with mobile shoppers belonging to the Millennial generation and ultimately encourage them to make purchases on an OGB app, it is recommended that retailers enhance their engagement strategies. Lastly, the platform should provide tools or channels to facilitate community communication and uphold users' collective efficacy beliefs, and it will facilitate group formation.

**Keywords:** Online Group Buying, Perceived Value, Customer Engagement, Collective Efficacy, Purchase Intention, Cognition-Affection-Conation Model

## **Introduction**

Thanks to the convenience of mobile apps and social media, customers now have various ways to engage and communicate with merchants, fellow buyers, and the platform itself, including instant messaging and online reviews. Collaborative consumption has recently become increasingly popular among online shoppers (Li et al., 2022). Online group buying (OGB) aggregates purchasers to attain economic scale and lower pricing. Consumers use OGB as a cost-saving tactic, while businesses recognize its potential as a business model and a means to attract social media traffic for a competitive advantage. Groupon, Pinduoduo, and LivingSocial exemplify some successful online group-buying platforms. The OGB market in China has experienced remarkable growth, with its annual value soaring significantly from 8.5 billion yuan in the year 2018 to 120.5 billion yuan by 2021. from 8.5 billion yuan in 2018 to 120.5 billion yuan in 2021, a 14-fold times increase (Statista, 2022). Meanwhile, OGB's user base has reached 646 million, showing a yearly growth rate of 37.44%. According to a study of one OGB platform, it accounts for 44% of Millennial consumers born between 1981 and 1996 (Niwonin, 2020). This social media-savvy Millennial with solid purchasing power presents an attractive market segment for OGB.

Despite OGB's promising development and market growth, some challenges still need to be addressed. Firstly, businesses must provide PV to survive and progress within the competitive landscape. Around 80% of app shoppers tend to cancel their orders before paying due to perceived uncertainty and fear (Wang et al., 2022); one of the reasons behind this behavior is that OGB shoppers often associate price discounts with low quality (Chen et al., 2023). Secondly, approximately 51% of installed apps are either never utilized or quickly removed after the initial use (Tarute et al., 2017). This can be attributed to a need for more comprehension and limited user engagement with these applications. Finally, OGB retailers always set minimum purchaser numbers for each deal. For group buying to achieve success, a considerable number of customers must buy the same products simultaneously. There are instances where clients go to the extent of inviting acquaintances or relatives to meet the minimum threshold of purchases.

Previous studies in OGB have primarily focused on customer satisfaction, loyalty (Nina Angelovska, 2023), and impulsive buying (Jingjing Sun et al., 2023). However, system research related to consumer psychology is lacking, and more attention should be given to purchasing intention (PI). It has been highlighted in Lim's (2020) paper that investigations into shoppers' motivations to buy on OGB could have been more urgent and needed. In order to address this knowledge gap, our study has adopted the C-A-C model (Zeithaml, 1988) as a research framework. This model proposes that customers' cognitive factors, such as their perceived values (PV) of products or services on OGB apps, significantly influence their PI. Additionally, our study introduces the concept of customer engagement (CE) as an essential affective attribute and explores the impact of group formation with collective efficacy on PI. To validate our research model, we surveyed 420 experienced clients from Pinduoduo (PDD), one of the

largest OGB platforms in China. PDD was selected due to its reputable business model and enough user pool, ensuring diverse opinions.

Based on the C-A-C model, to address the mentioned problems, a thorough analysis of context-specific variables and mechanisms that influence PI on OGB apps among Chinese Millennial mobile shoppers is needed. The following are the questions that aim to be explored in this study.

RQ1. Are perceived values and CE related to the OGB app's purchase intention among Millennial mobile shoppers?

RQ2. Is CE a mediating effect on PVs and purchase intention for the OGB app among Millennial mobile shoppers?

RQ3. Does collective efficacy moderate the correlation between CE and purchase intention?

This research aims to deal with three research gaps identified previously. The first gap pertains to the exploration of factors that drive PI. At the same time, existing research on OGB has primarily centered on the positive outcomes and favorable aspects encompassing affordability and convenience. More attention should be given to the comprehensive assessment of the advantages and drawbacks of previous research (Lim, 2020). This perspective can lead to a more balanced understanding of the value creation process. In order to fill this gap in the literature, our research employs the concept of PV to capture consumers' holistic evaluation of OGB apps in terms of what they receive and given (Zeithaml, 1988). Prior investigations in the field of service science have underscored the substantial impact of PV on consumer satisfaction and its influence on future behavior. Additionally, it is essential to examine the impact of CE on PI in the context of OGB apps (Sharma and Klein, 2020). This research should contribute to the study of OGB apps by investigating the relationship of consumer psychology between PV and CE toward PI.

Customer engagement (CE) is a term used to describe the affective bond established between two parties, such as businesses and customers (Hollebeek et al., 2019). Previous research has been extensively studied in social psychology and organizational behavior, such as branded mobile media, tourism, and omnichannel retailing (Yang et al., 2022). However, there needs to be more knowledge about whether CE can mediate the links between PV and PI in the context of Chinese OGB apps. Hence, this becomes the study's second gap. Finally, this study investigates collective efficacy in moderating the relationship between CE and PI. It seems that there are not enough "bookers" for the number of "lookers" (Baker et al., 2021), which exhibits the third gap in this study. Therefore, developing effective tactics to form customer groups to elicit favorable engagement reactions is imperative in scholarly discourse. Considering the group buying model and the Chinese feature of collective value, it is more suitable to employ collective efficacy as a moderator in the OGB study. Collective efficacy beliefs influence customer decisions and foster social cohesion among group members (Illia et al., 2011), leading to positive behavioral responses like PI (Bandura, 1986).

In order to bridge the gaps above, this research endeavor aims to elucidate the fundamental factors and mechanisms that contribute to the enhancement of PI within the realm of OGB. Initially, the study employs the perceived value theory to comprehend the implications of PVs

and CE on the PI of OGB apps. Subsequently, it investigates the mediating role of CE between PV and PI. Finally, the model further explores the moderating effect of collective efficacy on CE and PI. The theoretical foundation and hypotheses of the study are expounded upon in the subsequent section.

### **Theoretical Review**

This study adopted the Cognition-Affection-Conation (C-A-C) model (Hilgard, 1980); it is a widely used theory that explains how customer attitudes are formed in consumer psychology. This model demonstrates the sequential interaction of these three factors within the consumer's decision-making process, wherein cognition variables influence affection and subsequently impact conation. Classical theories like the Theory of Reasoned Action (TRA) (Fishbein, 1979), the Theory of Planned Behavior (TPB) (Ajzen, 1991), and the Stimuli-Organism-Response model (SOR) (Mehrabian, and Russell, 1973) have also incorporated the C-A-C model in their development. Compared to other models in the field of technological applications, the C-A-C model offers a more comprehensive understanding and more vital predictive ability for user shopping experiences and purchasing decisions. It provides a multifaceted perspective to comprehend the underlying mechanisms that drive human behavior (Qin et al., 2021b). It serves as a foundational theory for examining human behavior in various contexts, such as investigating on-demand service platforms' continued intention (Lu et al., 2022), analyzing impulsive shopping behavior (Lim and Kim, 2020), and exploring users' repeat use of augmented reality (Qin et al., 2021a).

### **Cognition**

The current study investigates customers' PV during the cognition stage. Cognition influences customers' perceptions, attitudes, and thoughts regarding a product (Y. H. Kim et al., 2013). The theoretical framework utilized in this research is derived from Zeithaml's (1988), theory of customer perceived value. This theory defines PV as consumers' subjective product assessment, considering what is received and given (Zeithaml, 1988). In their research, Sheth et al (1991), present a comprehensive value framework encompassing various facets such as functional, emotional, social, conditional, and epistemic values. Building upon this foundation, Sweeney and Soutar (2001), further contribute to understanding value by introducing four key dimensions: performance, monetary value, emotional value, and social value. Recently, research has shown that monetary, usefulness, and hedonic values are crucial to perceived benefits (Choi, 2016). For hedonic value in online shopping, Babin et al.(1994) posit that including adventurous elements in the shopping experience may contribute to creating hedonic shopping value. Furthermore, previous scholarly investigations have demonstrated that the perception of risk plays a significant role in shaping one's inclination to purchase. It is worth noting that this construct is multifaceted. Experts have observed that consumers perceive purchasing on OGB apps as risky due to potential product quality and performance issues, which can hinder online shopping (Hossain et al., 2021). The variation in values may depend on the deal and encompass economic, functional, and emotional aspects. PV's contextual nature is associated with cognition aspects (Lim and Kim, 2020). Lin et al (2022), showed how buyers' perceived value and the perceived risks of online group buying affect positive eWoM communication and repurchase intention. Sharma & Klein (2020) underscore the significance of consumer-perceived value as the pivotal factor in augmenting

the scope of group buying. Empirical evidence suggests that value directly or indirectly impacts customers' PI (Lim, 2020). Therefore, this study's primary goal is to investigate PVs by categorizing them into four categories: monetary value, perceived usefulness, adventure, and performance risk.

**Affection**

Consumers acquire knowledge about products during the cognitive stage, while the affective stage involves processing their emotional responses. Affection refers to customers' emotional and attitudinal reactions toward an object (Kim et al., 2013). Hirschman (1984) states that shopping experiences encompass the activation of individuals' thoughts and senses, making them intricate processes that offer cognitive and affective advantages. CE is widely recognized as mediating the relationship with user consumption trips. Scholarly investigations have consistently demonstrated that CE fosters consumer satisfaction throughout purchasing (Woratschek et al., 2020). Vivek et al (2014), defined customer engagement as the connections and interactions that a consumer or potential customer has with a brand or company's offerings. It encompasses conscious attention, enthusiastic participation, and social connection. In marketing, CE is crucial to consumer consumption behavior (Algharabat et al., 2020). Scholars in the marketing field have proposed that consumers are motivated to engage in retail shopping by utilitarian and hedonic factors (Babin et al., 1994). This perspective shows that highly engaged social media users create content, co-create consumer value, and recommend products, services, and brands. Furthermore, utilizing CE in social commerce is not solely an affective activity; it also necessitates positive emotions and energy to foster satisfactory interactions. CE promotes competitive advantage, positive referrals, organizational profit, and PI (Brodie et al., 2011).

**Conation**

Conation, the final component within the C-A-C model, represents the tangible expression of a consumer's intention to make a purchase (Hilgard, 1980). Conation is how people's intentions evolve and behave toward the object of interest (Oliver, 1999). However, PI directly indicates a customer's potential to purchase and significantly impacts their purchasing behavior from online retailers (Ajzen, 1991). Planned behavior is the primary concern of marketing researchers because many company decisions stem from the prediction of consumer behavior. Many investigations have been conducted to explore the connection between attitudes and behaviors in order to predict consumer behavior accurately. In many of these studies, it has been observed that changes in attitudes serve as a predisposing factor for changes in behavior. Numerous studies have examined OGB intention from various perspectives (Sharma and Klein, 2020). These studies consistently reveal that monetary, perceived usefulness, experience, and perceived risk significantly influence group purchasing behavior (Lim et al., 2022). When an enterprise successfully mitigates perceived risks associated with a product or service, consumers may perceive higher benefits (Lim, 2020). These findings are pertinent to the current investigation since they offer a foundation for comprehending the elements and problems influencing customers' purchasing intentions toward OGB apps. Therefore, gaining deeper insights into the factors that increase traffic and customers' PI is essential.

**Hypothesis Development**

Based on the C-A-C Model (Hilgard, 1980), combined with the theory of perceived value (Kim et al., 2007), CE (Vivek et al., 2014), and collective efficacy (Bandura, 2000), this research explored the factors and mechanism that driver PI on OGB app among Chinese Millennial mobile shoppers.

**Monetary Value and Purchase Intention**

Monetary value is the sum of the functional, psychological, and economic advantages that buyers expect (Kotler, 2003). The concept of purchase intention pertains to the inclination to acquire a particular product. This inclination typically emerges from the consumer's assessments and appraisals of the various choices at hand (Wu et al., 2012). Existing scholarly literature has been established that the perception of monetary value plays a significant role in influencing the perceived value. According to transaction utility theory, the monetary value of a product is expected to increase when its price becomes more advantageous for consumers (Yuan et al., 2022). Otherwise, consumers are unwilling to spend extra money on the same products and services. In the case of the OGB app, the consistent use of coupons is examined to determine the temporal effects of coupon redemption (Lim, 2020). So, the financial risk of experimenting with new products or services is decreased by this practice (Kumar and Rajan, 2012). Millennial consumers who rank highly on the price-conscious find shopping on the OGB app appealing (Klein and Sharma, 2022a). Consumers can achieve economic value and increase their returns, thus fulfilling their economic needs and facilitating transactions. This viewpoint has been further validated by mobile commerce studies (Maduku and Thusi, 2023) and mobile payment (Tsuchiya et al., 2022). Hence, this research also posits that monetary value will exert a comparable beneficial influence on PI in OGB apps among Millennial shoppers. The following assumptions are made:

*H1: Monetary value positively relates to OGB app purchase intention among Millennial mobile shoppers.*

**Perceived Usefulness and Purchase Intention**

Perceived usefulness refers to an individual's belief in how much a product or service can enhance their job performance (Davis, 1989). The concept of perceived usefulness contributes significantly to facilitating decision-making (Mohd Said et al., 2013). Literature indicates a close relationship between PI and perceived usefulness (Baker-Eveleth and Stone, 2020). Perceived usefulness is considered essential when shoppers intend to make purchases through the OGB app (Chiu et al., 2018). Compared to other retailing apps, experienced consumers may prefer OGBs because they can quickly and easily access relevant information. This perspective has also been substantiated through research conducted within the context of AI (Zhang and Wang, 2023) and social commerce (Shirazi et al., 2022). Consumers can obtain practical value, meet purchasing needs, or enhance efficiency, satisfying utilitarian value and resulting in transactions. Therefore, this study also believes that perceived usefulness is equally positive in influencing PI on the OGB app among Millennial shoppers. Assumptions are as follows:

*H2: Perceived usefulness positively relates to OGB app purchase intention among Millennial mobile shoppers.*

### **Adventure and Purchase Intention**

Adventure in the context of shopping refers to the perception of excitement, exploration, and a sense of being in a different world (Arnold and Reynolds, 2003). Based on McGuire's (1974), psychological motivations theory, adventure is a primary factor in hedonic value (Babin et al., 1994). As Parsons (2002), stated, more than 95% of participants indicated that they engage in shopping with the primary intention of experiencing sheer exhilaration and embarking on an adventurous journey—especially Millennials who follow their passions and live to explore. Therefore, the OGB app should be appealing to them. Selling exclusive products and services with limited time is group buying applications commonly highlight this aspect, offering a delightful opportunity for users to explore exclusive special offers that are not accessible elsewhere (Klein and Sharma, 2022b). Consequently, this platform allows customers to derive excitement and stimulation by accessing deals with substantial price reductions (Lau, 2011). In this manner, consumers may alleviate stress, relieve depression, or momentarily escape from their problems, thus fulfilling emotional requirements and leading to purchases. This perspective has also been substantiated through research conducted on online auction shopping (Lee et al., 2013) and green apparel (Kumar and Yadav, 2021). Therefore, this study also believes that adventure is equally positive in influencing PI on the OGB app among Millennial shoppers. Assumptions are as follows:

*H3: Adventure positively relates to OGB app purchase intention among Millennial mobile shoppers.*

### **Performance Risk and Purchase Intention**

Performance risk refers to the financial loss that consumers experience when the performance of a purchased brand falls short of their expected level of satisfaction (Forsythe et al., 2006). According to Cox & Rich (1964), performance risk in purchasing decisions encompasses various financial, temporal, and effort-related uncertainties. Risk perception may lead to a decrease in PI (Tong, 2010). While the OGB app facilitates consumers in acquiring desired products with notable cost reductions, concerns have arisen regarding fraudulent conduct and counterfeit goods within the Chinese OGB market (CECRC, 2017). Furthermore, consumers perceive purchasing on OGB apps as a product quality and performance risk, which hinders online shopping (Hossain et al., 2021). This perspective has also been substantiated through research conducted within mobile commerce (Marriott and Williams, 2018) and AI (Zhang et al., 2022). Therefore, this study hypothesizes that Millennial mobile users are discouraged from purchasing on OGB due to potential performance risks on OGB apps. The following assumption is made:

*H4: Performance risk negatively affects OGB app purchase intention among Millennial mobile shoppers.*

### **Customer Engagement and Purchase Intention**

CE is the degree to which a customer interacts and participates in a company or brand's goods or services (Vivek et al., 2014). Several studies have found a relationship between CE and PI

in online marketing [36, 70]. Effective CE management is crucial for online vendors throughout the transaction process. This is because highly engaged customers have a perception of pricing as more fair and reasonable compared to those who are disengaged or less engaged (Denktaş-Şakar and Sürücü, 2020). This perspective has also been substantiated through research on living streams (Zheng et al., 2022) and social commerce (Shirazi et al., 2022). This approach allows consumers to establish effective communication channels with the seller, gain deeper insights into the product, and cultivate a mutually beneficial relationship. As a result, CE will lead to an increased intention to purchase. Therefore, this study also believes CE positively influences PI on the OGB app among Millennial shoppers. Millennial mobile shoppers may want to buy when highly engaged with OGB apps. Therefore, we make the following assumptions:

*H5: Customer engagement positively relates to OGB app purchase intention among Millennial mobile shoppers.*

### **Perceived Values and Customer Engagement**

This study defines PV as consumers' subjective product assessment, considering what is received and given (Zeithaml, 1988). Their perception of value influences customers' behavior in engaging with a brand or company (Klein and Sharma, 2022b). Previous empirical investigations have demonstrated a strong positive correlation between consumers' perception of value and their level of engagement (Itani et al., 2020; Lim et al., 2019). Customers perceive higher benefits when businesses reduce the perceived cost of their products or services (Lim, 2020). Therefore, OGB apps should promote perceived benefits and reduce perceived risk through CE (Klein and Sharma, 2022b). These PVs enable consumers to assess the product and decide more confidently. Based on this evidence, the perception of values is crucial in building CE with customers in OGB apps. The behavioral model suggests that cognition significantly influences affection (Fishbein, 1979). This perspective has also been substantiated through research on loyalty programs (Meyer-Waarden et al., 2023) and tourism (Touni et al., 2022). The PV impacts CE, facilitating communication between customers and merchants and exerting good or bad effects on product purchases. Therefore, this study also believes that perceived benefits and perceived risk will positively or negatively impact CE on the OGB app among Millennial shoppers. Assumptions are as follows:

*H6a: Monetary value is positively related to customer engagement among Millennial mobile shoppers.*

*H6b: Perceived usefulness positively relates to customer engagement among Millennial mobile shoppers.*

*H6c: Adventure is positively related to customer engagement among Millennial mobile shoppers.*

*H6d: Performance risk negatively affects customer engagement among Millennial mobile shoppers.*

### **Mediating Role of Customer Engagement**

Interactions between customers and companies can lead to a psychological state known as CE (Brodie et al., 2013). CE is a mediating variable in many marketing studies, significantly



affecting consumer and business relationships. Previous studies have demonstrated that CE mediates the relationship in various contexts, including branded mobile media (Lim et al., 2021a), tourism (Abou-Shouk and Soliman, 2021), and omnichannel retailing (Yang Li and Xiang Gong, 2022). On OGB apps, consumers' perceptions of their relationship with the seller are heavily influenced by CE (Sharma and Klein, 2020). Merchants' different forms of interaction with customers can affect their intentions and behavior. The CE mediates between PV and PI. In this model, customer engagement is regarded as a mechanism that intervenes in the nexus between the four cognitive factors (i.e., monetary value, perceived usefulness, adventure, and performance risk) and the conative factor (i.e., purchase intention). Also, as explained earlier, research shows that the perceived values assist individuals in enhancing their cognitive processes by enabling them to recognize their presence within and potentially engage in activities on the OGB app. This perspective has also been substantiated through research on retailing platforms (Roy et al., 2023) and luxury brands (Rahman et al., 2023). Utilizing this mechanism can strengthen the relationship between customers and retailers. The level of customer engagement in group buying depends largely on the services provided by the OGB seller. When millennial mobile shoppers approach sellers psychologically, they have a better relationship with sellers and are more likely to use and purchase on OGB apps. Thus, the suggested model proposes that CE mediates the relationships between monetary value, perceived usefulness, adventure, performance risk, and subsequent PI. Assumptions are as follows:

*H7a: Customer engagement mediates the relationship between monetary value and OGB app purchase intention among Millennial mobile shoppers.*

*H7b: Customer engagement mediates the relationship between perceived usefulness and OGB app purchase intention among Millennial mobile shoppers.*

*H7c: Customer engagement mediates the relationship between adventure and OGB app purchase intention among Millennial mobile shoppers.*

*H7d: Customer engagement mediates the relationship between performance risk and OGB app purchase intention among Millennial mobile shoppers.*

### **Moderating Role of Collective Efficacy**

Collective efficacy means the shared belief within a group that they can achieve their objectives and engage in collaborative activities effectively (Illia et al., 2011). This belief in collective efficacy impacts member participation in a group (Alavi and McCormick, 2018). Previous studies have shown a correlation between peer communication on social media platforms and its influence on product engagement and purchasing incentives (Wang et al., 2012). Furthermore, improving collective efficacy among consumers can foster group cohesion and increase the likelihood of positive behavioral reactions, such as PI (Arslanagic-Kalajdzic et al., 2022). The findings suggest that customers' purchasing behavior is influenced by collective efficacy in CE, both consciously and unconsciously, through their close partners and family (Essiz and Mandrik, 2021). This perspective has also been substantiated through research conducted within procedural justice (Wu and Liu, 2023) and online teaching (Awuor et al., 2022). In OGB apps, collective efficacy is expected to moderate CE and PI. Collective efficacy plays a moderating role in CE and PI, thereby enhancing team performance and

facilitating business transactions. It may influence the formation of millennial mobile shoppers who make purchases on OGB apps. The assumptions are as follows:

*H8: Collective efficacy moderates the relationship between customer engagement and PI on OGB apps among Millennial mobile shoppers.*

A research model (see Fig. 1) was developed to test the hypotheses.

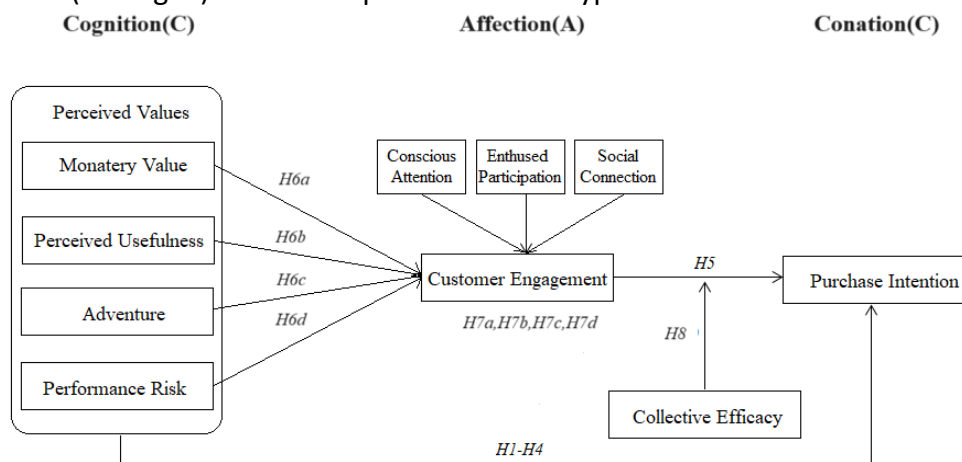


Figure 1: Research Model

**Method**

*Survey Development and Sampling*

The study recruited Chinese individuals from the Millennial generation (born between 1981 and 1996) as participants. They were chosen based on their association with high-tech Millennials and extensive experience with online purchasing (Sohaib and Han, 2023). The research focused explicitly on PinDuoDuo (PDD) users who had utilized the platform within the past six months. To ensure accurate and concise results, the survey only collected data from users who had already undergone pre-screening from a large sample size. Data collection was facilitated through a popular Chinese survey platform called Wenjuanxing. The survey hyperlink was distributed to participants through Chinese social media apps, WeChat and QQ. Respondents could complete the survey using their preferred devices; the research object and estimated length were explained to respondents before beginning the survey. Between August and September of 2023, 921 responses were collected. After removing 501 unqualified responses, 420 responses remained for analysis. According to a post hoc power analysis conducted by F Faul et al. (2007), this sample size of 420 participants was deemed sufficient to meet the minimum requirement. The analysis assumed an effect size of 0.15 and a power level of 80%; the results indicate that most respondents were female (62.90%) and had completed a master's degree (43.60%), about 25.50% of participants reported earning between US\$411 and US\$822 monthly. Additionally, approximately 36.90% of participants had used the PDD application for their purchases for over three years (see Table 1).

Table 1  
*Respondent profile*

Demographic Variable	Category	Frequency (n=420)	(%)
<i>Gender</i>	Male	156	37.10
	Female	264	62.90
<i>Education level</i>	Compulsory education	27	6.40
	Diploma	42	10.00
	Degree	105	25.00
	Master	183	43.60
	Phd	63	15.00
<i>Monthly income(US\$)</i>	Below 411	82	19.50
	411-822	107	25.50
	822-1233	106	25.20
	1233-1644	59	14.00
	1644-2055	24	5.70
	Over 2055	42	10.00
<i>PDD use time</i>	Below 6 months	42	10.00
	Between 7-12 months	51	12.10
	Between 13-24 months	91	21.70
	Between 25-36 months	81	19.30
	Over 3 Years	155	36.90
<i>PDD use frequency</i>	Daily	20	4.80
	Weekly	112	26.70
	Monthly	148	35.20
	Quarterly	75	17.90
	Half a year	35	8.30
	Annual or less	30	7.10

### Measures and Data Analysis

This study employed validated scales (see Table 2). The constructs of purchase intention, monetary value, perceived usefulness, adventure, and performance risk were adapted from previous studies conducted by Kim Park (2013), Sweeney & Soutar (2001), Yu et al (2017), Arnold & Reynolds (2003), and (Jacoby & Kaplan, 1972). Additionally, Vivek et al (2014), examined conscious attention, enthusiasm engagement, and social connection, while the collective efficacy construct from Jung and Sosik Jung (2002), was incorporated. To ensure the measurement's reliability, two preliminary tests were conducted to predict potential problems in the management survey. Firstly, a pre-test involving ten respondents who

frequently used OGB for purchases was conducted to review the questionnaire. Thirty individuals who closely examined and responded to the items were administered a pilot test. Although some minor revisions were made, all constructs demonstrated satisfactory reliability. The Partial Least Squares Structural Equation Modeling (PLS-SEM) technique was employed to assess the theoretical framework, a causal-predictive methodology widely utilized in various social science fields, including marketing (Sarstedt and Cheah, 2019). PLS-SEM employs a causal-predictive methodology that enables researchers to optimize their ability to explain and predict phenomena. According to Hair et al (2019), the SmartPLS software was employed for the evaluation, consisting of two distinct stages: measurement model and structural model.

## Empirical Results

### *Common Method Bias*

Harman's single-factor analysis determined that a single component accounted for only 25.62% of the variance, below the established threshold of 50%, as Podsakoff et al (2012), suggested. Furthermore, a comprehensive collinearity test revealed that the variance inflation factor (VIF) values for all components ranged from 1.023 to 2.989, which were below the threshold of 3.33 (Table 2), as proposed by Kock & Lynn (2012). These findings indicate that CMB, as measured by the VIF, did not pose a significant issue in this study.

### Measurement Model Assessment

The measurement model assessment involved the use of validated questionnaires, which were scored on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) (Table 2). The measurement model was evaluated based on three factors. Hair et al (2019), recommended that composite reliability ratings exceeding a threshold of 0.70 were sought.

Table 2

*Constructs, measurement item, and measurement model assessment*

Construct	Item	Loading	CR	AVE	FC
Monetary Value (Sweeney and Soutar, 2001)	MV1. The prices of the products in this OGB app are fair.	0.791	0.902	0.696	1.506
	MV2. The OGB app offers reasonably priced goods.	0.855			
	MV3. When I purchase anything through this OGB app, I get value for my money.	0.853			
	MV4. Using this OGB app for purchasing is cost-effective.	0.837			
Perceived Usefulness (Yu et al., 2017)	PU1.I can shop efficiently using this OGB app at any time and anywhere	0.818	0.920	0.741	1.716
	PU2.I can find products using this OGB app at anytime and anywhere	0.831			
	PU3.It is convenient to shop with this OGB app.	0.904			
	PU4.Shopping on this OGB app is useful to my daily life.	0.889			

Adventure (Arnold and Reynolds, 2003)	AD1.Shopping on this OGB app is an interesting and adventurous experience.	0.773	0.906	0.708	1.555
	AD2.I find shopping on this OGB app stimulating.	0.820			
	AD3.I find shopping on this OGB app thrilling.	0.884			
	AD4.Shopping on this group buying app gave me a wonderful experience.	0.883			
Performance Risk (Jacoby and Kaplan, 1972)	PR1. This OGB app may lead to products that need to be fixed.	0.958	0.800	0.522	1.023
	PR2. By utilizing this OGB app, I may obtain products that satisfy others but fail to satisfy myself.	0.836			
	PR3. Due to the ambiguity of the product instructions for items acquired through this OGB app, I need help comprehending every function.	0.478			
	PR4. Upon receiving a product through this OGB app, it may be inferior.	0.494			
Conscious Attention (Vivek et al., 2014)	CA1.I am interested in learning more about this OGB app.	0.811	0.930	0.690	1.970
	CA2.I appreciate the events associated with this OGB app.	0.808			
	CA3.I am interested in acquiring further knowledge regarding this OGB app.	0.858			
	CA4. Pay close attention to every aspect of this OGB app.	0.849			
	CA5.I observed developments in this OGB app.	0.852			
	VA6.I am intrigued by anything associated with this OGB app.	0.851			
Enthused Participation (Vivek et al., 2014)	EP1.I use the OGB app frequently.	0.838	0.910	0.718	2.989
	EP2.I love this OGB app.	0.882			
	EP3.This OGB app is on my schedule.	0.859			
	EP4.My days would be the same if I had this OGB app.	0.807			
Social Connection (Vivek et al., 2014)	SC1. I know a lot about this OGB app.	0.831	0.939	0.756	2.664
	SC2.I enjoy discussing this OGB app with my pals.	0.867			
	SC3.Visiting this OGB app is more fun than being with friends.	0.905			
	SC4.Visiting this OGB app with my friends is fun.	0.916			
	SC5.Overall, I felt positive when I engaged with this OGB app.	0.835			

Purchase Intention (Kim and Park, 2013)	PI1. I want to use this OGB app to buy goods and services.	0.860	0.932	0.773	1.738
	PI2. I plan to buy things via the OGB app.	0.871			
	PI3. I recommend purchasing products on this OGB app soon if the opportunity allows.	0.910			
	PI4. I anticipate purchasing items through this OGB app soon.	0.876			
Collective Efficacy (Jung and Sosik, 2002)	CO1. We fully believe in our increased bargaining power with vendors on this OGB app.	0.769	0.893	0.626	1.469
	CO2. We can purchase goods at lower prices on this OGB app.	0.778			
	CO3. We know we can prevent deception on this OGB app.	0.780			
	CO4. We know we can prevent disputes on this OGB app.	0.815			
	CO5. We are confident in our transaction success.	0.814			

Notes: CR: composite reliability; AVE: average variance extracted; FC: full collinearity

According to Hair et al (2019), the findings presented in Table 2 indicate that the convergent validity was met when the average variance extracted was more significant than 0.50. According to the recommendation by Hair Jr et al (2017), outer loadings exceeding 0.708 are better, and a construct can account for at least 50 percent of the variance in the indicators. Conversely, it is recommended to exclude any outer loadings that are below 0.4 (Bagozzi et al., 1991) unless the construct achieves a score of 0.5 or higher for the AVE score (Hulland, 1999).

Table 3  
*Discriminant validity*

Construct	1	2	3	4	5	6	7	8	9
1. Adventure									
2. Conscious Attention	0.480								
3. Collective Efficacy	0.661	0.407							
4. Monetary Value	0.574	0.309	0.612						
5. Enthused Participation	0.550	0.772	0.446	0.351					
6. Performance Risk	0.067	0.107	0.088	0.084	0.12				
7. Purchase Intention	0.493	0.484	0.371	0.512	0.684	0.097			
8. Perceived Usefulness	0.555	0.365	0.616	0.699	0.426	0.130	0.514		
9. Social Connection	0.425	0.720	0.359	0.254	0.835	0.108	0.524	0.333	

Notes: HTMT < 0.85  
(Henseler et al., 2015)

Table 3 shows that discriminant validity is acceptable if each latent construct's HTMT score is less than 0.85 (Hair et al., 2019a).

**Higher-Order Construct Assessment**

This study evaluated the higher-order construct using the methods proposed by Cheah et al (2019). For CE, a global item was first created and tested. With a route coefficient of 0.782, the redundancy analysis verifies that the dimensions and constructs associated with customer engagement converge beyond the 0.708 threshold. Furthermore, an examination is conducted on comprehensive collinearity issues.

Table 4  
*Higher-order construct*

Higher-order construct	Lower-order construct	Convergent validity	Weight	VIF	SE	t-value	p-value
CE	Conscious Attention	0.782	0.200	2.090	0.061	3.260	0.001
	Enthused Participation		0.786	2.672	0.064	12.282	0.000
	Social Connection		0.083	2.422	0.068	1.222	0.111

The VIF values in Table 4 are below the established threshold of 3.3, suggesting that the dimensions are distinct. The investigation has focused on the outward weight and relevance of the dimensions. Two dimensions (i.e., conscious attention and enthusiastic participation) are significant, although the social connection is not statistically significant (p<0.05).

**Hypotheses Testing**

The present study additionally offers the coefficient of determination ( $R^2$ ), effect size ( $f^2$ ), and predictive relevance ( $Q^2$ ) as tools for evaluating the robustness of the structural model. Primarily, the model exhibits significant explanatory power, with monetary value, perceived usefulness, adventure, and performance risk accounting for 31.7% in CE and 48.7% in PI. Next, the significance of each path was evaluated by calculating the effect size ( $f^2$ ), as stated by Hair et al (2019), to ensure accuracy. Following Cohen's (1988), criteria, the effect size was categorized into four grades: large (0.35), medium (0.15), small (0.02), and trivial ( $<0.02$ ). Examination of the results presented in Table 5 indicates that the dataset demonstrates a negligible effect size ( $f^2 < 0.02$ ) (i.e., H6a). Furthermore, the associations related to H1 (Monetary Value $\rightarrow$ PI), H2 (Perceived Usefulness $\rightarrow$ PI), H3 (Adventure $\rightarrow$ PI), H4 (Performance Risk $\rightarrow$ PI), H6b (Perceived Usefulness $\rightarrow$ CE), and H6d (Performance Risk $\rightarrow$ CE) illustrated a small effect size ( $f^2=0.02-0.052$ ), while H5 (CE $\rightarrow$ PI), and H6c (Adventure $\rightarrow$ CE) exhibited a medium effect size ( $f^2 = 0.161-0.33$ ). The most significant predictor of CE is found to be adventure ( $f^2=0.161$ ), while perceived usefulness, performance risk, and monetary value have minor but meaningful effects ( $f^2=0.049$ ,  $f^2=0.049$ ,  $f^2=0.000$  respectively). Moreover, the assessment of predictive relevance is conducted utilizing Stone-Geisser's  $Q^2$ (Stone, 1974). In the current dynamic landscape of business, both practitioners and scholars have been growing their focus on the concept of CE due to its role in the creation of customer experience and value. Furthermore, the  $Q^2$  values for CE (0.232) and PI (0.365) are statistically significant, indicating the model's predictive relevance (Hair et al., 2019b).

Table 5  
*Results of the structural model*

Path Relationship	Std beta	Std error	t-value	p-value	95% Bca CI LB UB	VIF	$f^2$	$R^2$	$Q^2$
H1: Monetary Value $\rightarrow$ PI	0.220	0.048	4.615	0.000	(0.142-0.300)	1.810	0.052	0.487	0.365
H2: Perceived Usefulness $\rightarrow$ PI	0.136	0.053	2.583	0.005	(0.052-0.225)	1.962	0.018		
H3: Adventure $\rightarrow$ PI	0.046	0.052	0.900	0.184	(0.037-0.133)	1.836	0.002		
H4: Performance Risk $\rightarrow$ PI	0.146	0.043	3.425	0.000	(0.083-0.196)	1.078	0.039		
H5: CE $\rightarrow$ PI	0.506	0.049	10.360	0.000	(0.418-0.578)	1.514	0.330		
H6a: Monetary Value $\rightarrow$ CE	-0.005	0.072	0.075	0.470	(-0.115-0.120)	1.741	0.000	0.317	0.232
H6b: Perceived Usefulness $\rightarrow$ CE	0.241	0.059	4.085	0.000	(0.137-0.332)	1.755	0.049		
H6c: Adventure $\rightarrow$ CE	0.395	0.063	6.322	0.000	(0.290-0.497)	1.422	0.161		
H6d: Performance Risk $\rightarrow$ CE	-0.185	0.076	2.432	0.008	(-0.260-0.042)	1.024	0.049		



H7a: Monetary Value→CE→PI	-0.003	0.036	0.075	0.470	(-0.060-0.059)		
H7b: Perceived Usefulness→CE→PI	0.122	0.033	3.665	0.000	(0.065-0.174)		
H7c: Adventure→CE→PI	0.200	0.037	5.480	0.000	(0.127-0.274)		
H7d: Performance Risk→CE→PI	-0.093	0.040	2.341	0.010	(-0.136-0.020)		
H8: Collective Efficacy x CE→PI	0.055	0.026	2.145	0.016	(0.012-0.096)	1.043	0.007

**Notes:** CE: customer engagement; PI: purchase intention

The researchers employ a bootstrapping technique, generating 5,000 subsamples to evaluate their hypothesis. Appendix 3 illustrates a significant direct and indirect relationship between PVs and PIs. Strong influences on PI include monetary value ( $\beta=0.220$ ), performance risk ( $\beta=0.146$ ), and CE ( $\beta=0.506$ ), which are significant at  $p=0.000$ , and perceived usefulness ( $\beta=0.136$ ,  $p=0.005$ ) also influence customer PI on OGB. Thus, H1, H2, H4, and H5 are supported, especially for CE, which showed a significant main effect with the highest value. However, only H3 adventure ( $\beta=0.046$ ,  $p=0.184$ ) is insignificant. Then, the results similarly support the relationship between PV and CE. Perceived usefulness ( $\beta=0.241$ ) and adventure ( $\beta=0.395$ ) were significant at  $p=0.00$ , performance risk ( $\beta=-0.185$ ,  $p=0.008$ ) also showed impact on CE, H6a, H6b, and H6d proposed all are supported, only monetary value (H6c) is insignificant ( $\beta=0.005$ ,  $p=0.470$ ).

According to Preacher & Hayes (2008), the mediation analysis results suggest that CE mediates the relationship between PV and PI; strong influences include perceived usefulness ( $\beta=0.122$ ) and adventure ( $\beta=0.200$ ) were significant at  $p=0.00$ , and performance risk ( $\beta=0.093$ ,  $p=0.010$ ) also have effect, so H7b, H7c, and H7d are confirmed, except monetary value ( $\beta=0.005$ ,  $p=0.470$ ) is insignificant. Finally, the moderator collective efficacy significantly affected CE and PI with the result ( $\beta=0.055$ ,  $p=0.016$ ). As a result, apart from H3 and H7a are considered insignificant, while the remaining hypotheses are supported.

A two-stage methodology was employed to evaluate moderators' performance to create interaction terms among the predictor variables (Becker et al., 2018).

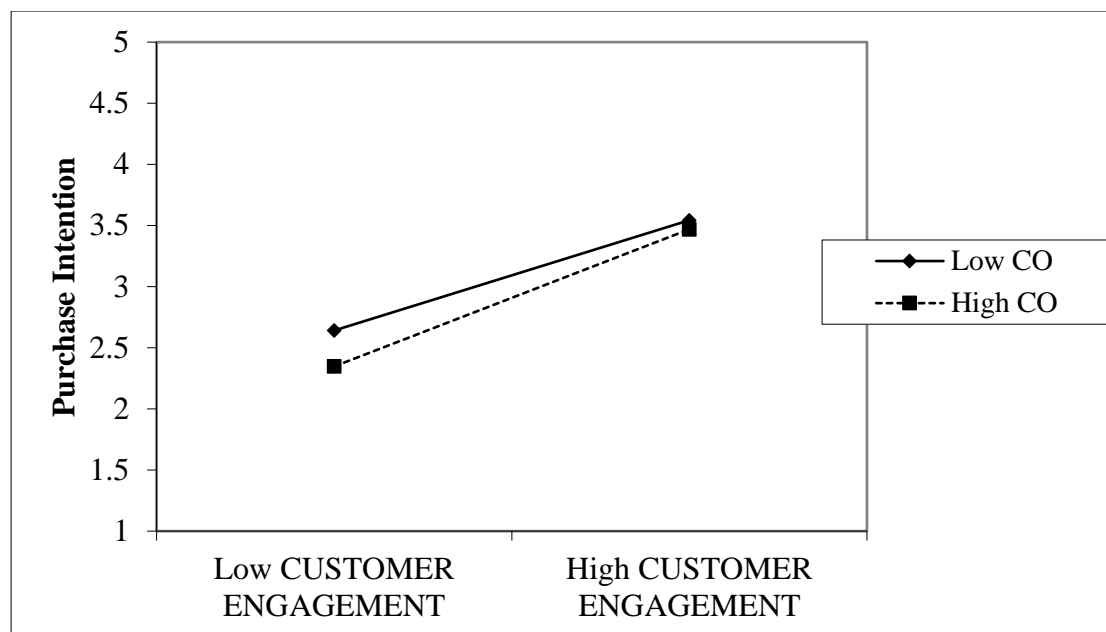


Figure 2 Interaction plots

The data depicted in Figure 2 illustrate the influence of collective efficacy on CE and PI. The connection between both variables is stronger when collective efficacy is high, as indicated by the steeper gradient of the dotted line compared to the solid line. A robust collective efficacy implies a moderate association linking CE and the intention to purchase. Thus, the study hypothesis H8 has also been validated.

## Discussions

*The Relationships between Perceived Values, Customer Engagement, and Purchase Intention*  
Regarding the antecedents of cognition, we found that the results demonstrate a significant relationship between the hypothesized PVs and CE on the PI of the OGB, except for adventure. It aligns with that PV directly or indirectly impacts customers' purchase intentions (Lim, 2020). Therefore, the first objective is fulfilled. In three out of four PVs, monetary value had the most decisive influence on the PI of the OGB. This result is not surprising in an OGB domain, with monetary value as a determining factor in the PI of the OGB app; it is consistent with Millennial consumers who rank highly on the price-conscious (Klein and Sharma, 2022b). On the other hand, our results indicate that individuals evaluate the combined impact of value and risk when deciding to engage in online shopping. Previous research has suggested that online consumers place greater importance on perceived risks than the values they would gain. However, our recent findings suggest that the influence of monetary value and CE surpasses the concerns related to performance risk.

However, only adventure is insignificant to PI on online group buying apps. The increase may influence this unexpectedly insignificant relationship of adventure in performance risk perception, so the importance of adventure decreases. It is also partially related to the purpose of the purchase. On the OGB app, users purchase goods mainly to meet their needs. The practical value of goods (i.e., monetary value, perceived usefulness, and product performance) has a more critical impact on purchase intention than hedonic value. Therefore,

the utilitarian value of goods significantly impacts PI more than the hedonic value/ adventure (Bauer et al., 2006). Consequently, most experienced buyers tend to prioritize functionality and task-oriented goals.

Last but not least, the findings of our study revealed that CE exerted the most significant influence on PI in the OGB app context across all respondents. Although there are slight variations between Western countries and China, the study's significant findings are consistent with earlier research suggesting that CE is crucial in determining a customer's PI (Sharma and Klein, 2020). Therefore, it is essential to comprehend the factors and mechanisms that can enhance customer visits and conversion rates on the OGB app.

### **Mediating Effect of Customer Engagement**

Subsequently, the investigation reveals a noteworthy impact of PVs on CE. The above research results exhibit a discernible correlation between customers' perceived usefulness, adventure, and performance risk directly impacting CE. It aligns with previous research; the results presented in this study support previous conclusions about the positive impact of PVs on CE (Itani et al., 2019). Adventure emerges as the most influential factor among them. The findings validate our initial hypothesis that many individuals who engage in online shopping exhibit a proclivity for sensation-seeking behavior and a desire to attain and sustain a particular level of arousal (Arnold and Reynolds, 2003). Only monetary value is insignificant; it may indicate that sometimes, the notion of deriving adventure or hedonic value from perceptions of bargains extends beyond mere monetary value or transactional utility, as Babin et al (1994), stated. Although the OGB app enhances transparency by providing detailed information about prices and available products, customers appear to prioritize other factors when engaging with the brand.

As proposed, the research results demonstrated that CE mediates between PVs and PIs. Apart from monetary value, all the related constructs were significant drivers of behavioral intention. It partially attributed that Millennials who shop on the OGB app place value on adventure and hedonism (Arnold and Reynolds, 2003), their decision-making style may become more emotionally driven or influenced by group members, and sometimes impulsive purchases may be made without considering the monetary value. Furthermore, adventure emerges as the most influential factor among them. Therefore, incorporating adventure components in the OGB app significantly enhances CE beyond perceived usefulness and performance risk concerns. The current finding is consistent with those who report the mediating effect of CE on PI in the OGB app (Klein and Sharma, 2022c).

Furthermore, this study identifies conscious attention, enthusiastic participation, and social connection as essential components of CE. These findings support the theoretical framework conceptualizing CE as a reflective second-order construct. When constructing OGB models and developing successful apps, it is crucial to consider the role of CE (Sharma and Klein, 2020). In conclusion, customers' cognition processes influence their engagement and behavior (Qin et al., 2021c; Zhu et al., 2019). These findings confirmed that CE can mediate the relationship between PVs and PI in the context of OGB, and the second objective was also reached.

**Moderating Effect of Collective Efficacy**

The study shows that collective efficacy moderates the influence of affection CE and conation PI. As demonstrated, CE and PI may differ among different group performances of OGB shoppers. This discovery supports the idea that collective efficacy is closely linked to group outcomes (Wang and Lin, 2007). It is consistent with the idea that higher levels of collective efficacy are associated with greater adherence to purchase plans (Alavi and McCormick, 2018). Hence, the study goes beyond the C-A-C framework and posits the relevance of group performance, further elucidating the relationship between CE and PI in the OGB context. The results showed that collective efficacy implies a moderate association linking CE and PI, thus meeting the third objective.

**Implications of The Study***Theoretical Implications*

The study's implications are deliberated upon regarding both theoretical and practical domains. The current investigation makes noteworthy contributions to the existing body of literature on consumer psychology in three distinct dimensions. Firstly, it scrutinizes the phenomenon of PI on the OGB app by employing the C-A-C model (Hilgard, 1980). It suggests a comprehensive value framework (Babin et al., 1994; Holbrook, 1999) comprising four cognition factors: monetary value, perceived usefulness, adventure, and performance risk. PVs and CE did have a significant role in understanding consumers' PI on OGB, thus adding value to existing knowledge. Although PVs have a distinct effect, the most crucial variable in OGB when explaining consumer PI is CE. Therefore, researchers should include engagement as one of the valuable strategies to impact PI on the OGB app. Meanwhile, the findings show that the OGB apps' use of CE to promote customers' purchase intention is successful. This improves past research that only examines the direct correlation between PV and PI.

Moreover, this study aims to enhance the comprehension of CE as a mediator by examining the relationship between PV and PI, thereby expanding the definition of the concept as a three-dimensional higher-order construct. Therefore, PVs include benefits or sacrifices based on cognition and affection states; they thoroughly comprehend the process that encourages purchasing OGB apps. The evidence presented in this study highlights the urgent necessity for relationship management in both physical and online environments. These findings align with earlier assertions that the dynamics of user-retailer relationships have evolved beyond simple transactions, becoming more intricate and complex (Lim et al., 2021b). Consequently, our research extends the existing body of knowledge by comprehensively understanding the mechanisms that enhance purchase intention in online shopping. By employing engagement theory and focusing on engaging Millennial users, this study contributes to understanding engagement and relationship management.

Finally, previous studies have assumed that group performance is consistent across the link between app features and engagement without considering the potential differences among groups. Using the boundary condition of collective efficacy, this study contributes to the existing research by explicitly testing the moderating role of collective efficacy, applying Bandura's (1986) definition of collective efficacy explicitly in the context of the OGB app. The findings suggest that higher levels of collective efficacy are associated with greater adherence

to customers' purchase plans, consistent with previous research indicating that collective efficacy influences individuals' efforts to engage in group activities (Alavi and McCormick, 2018). Consequently, collective efficacy in OGB positively correlates with participant group performance and influences CE and PI. Using collective efficacy as a moderator is reasonable when examining the ease or difficulty with which a buyer can carry out their intention to purchase using an OGB app. The empirical discoveries presented in this study address a fresh viewpoint in the current body of literature and contribute novel understandings regarding the phenomenon observed in collective efficacy on the OGB app among Chinese millennials.

### **Practical Implications**

This study provides pertinent insights for stakeholders regarding users' expectations of a specific OGB app. Firstly, to appeal to potential purchasers, OGB merchants should offer many benefits associated with OGB shopping. These include an extensive range of products, comprehensive product details, competitive pricing, and convenient shopping experiences. Additionally, providing exceptional services, such as efficient resolution of issues and returns, and compensating buyers for any inconveniences they may encounter is crucial. This would help attract the lucrative Millennial mobile shopping market. Secondly, to effectively interact with mobile shoppers belonging to the Millennial generation and ultimately encourage them to make purchases on an OGB app, it is recommended that retailers enhance their engagement strategies. OGB retailers could offer more personalized discounts, prompt customer service, and user-generated content for sharing thoughts. Lastly, the platform should provide tools or channels to facilitate community communication and uphold users' collective efficacy beliefs, and it will facilitate group formation. Peer interaction on social media within the app can influence shoppers' group engagement with the product and arouse their motivation to purchase together.

### **Limitations and Future Research**

This study shares similar limitations with previous studies. Because of the small sample size and sole focus on using the OGB app among Chinese Millennials, the generalizability of the current study's findings may be limited. Therefore, future research should utilize samples that effectively represent the specific region or global market through comparative analysis or alternative methodologies. The study revealed that specific underlying values influence PI on the OGB app. Further research is needed to conduct a comprehensive analysis or explore alternative methodologies to thoroughly investigate the value of OGB from different perspectives. Lastly, the current study primarily examined team psychology on the PI with collective efficacy. Future research could incorporate other factors to provide a clearer understanding of the collective purchase behavior in the retailing market of consumer psychology, benefiting relevant stakeholders.

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**Acknowledgements**

Thanks for the *UPM* for providing the supports for this study, and this work is supported by self-financial.

**Competing interests**

The authors declare no competing interests.

**Ethical approval**

This research was approved by the Jawatankuasa Etika Universiti Untuk Penyelidikan Melibatkan Manusia, Universiti Putra Malaysia (No. JKEUPM-2023-682). The procedures used in this study adhere to the tenets of the Declaration of Helsinki.

**Informed consent**

Written informed consent was obtained from all participants in this study before commencing the survey.

**Data availability**

The datasets generated and/or analyzed during this study are not publicly available due to general data protection regulations, but are available from the corresponding authors on reasonable request.