The Impact of a Virtual Reality Incorporated Marketing Approach on Customer Purchase Behavior - Using Customer Experience as a Moderator

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ABSTRACT: *The development and application of Virtual Reality (VR) technology in many industries is accelerating, and how it affects customer purchase behavior and customer experience is one of today's most important research issues. The primary objective of this study is to verify the impact of virtual reality marketing on customer purchase behavior, using customer experience as a moderator. The scope of this study is to interview college students in southern Taiwan, who have experienced virtual reality. Purposive Sampling was adopted to conduct the sampling of the population, and the sample questionnaires are archived. Because this study falls under the category of Confirmatory Factory Analysis (CFA), the Linear Structural Equation Molding (SEM) operation and analysis established in this study were performed using Amos software. The results of the study show that: (1) there is a positive, but insignificant, effect of VR-incorporated marketing on customer experience (CE); (2) there is a positive, and significant, effect of customer experience (CE) on customer purchase behavior (CPB); and (3) there is also a positive, and significant interaction, effect of VR- and customer experience (CE)-incorporated marketing approach on customer purchase behavior (CPB). The results of this study can be used as a reference for the industry's business operations.*
KEY WORD: *Virtual Reality, Customer Experience, Purchase Behavior*

I. INTRODUCTION

With the advancement and popularity of AR and VR technologies, the emergence of virtual worlds, metaverse, NFT and other virtual concepts and products has become a new trend of industry. By combining technology innovation and customer preference, enterprises can create considerable business opportunities.

As this technology continues to innovate, companies from retail to manufacturing are competing to apply these new technologies to their products, marketing strategies and workflows. Through the application of a virtual-reality interface, they are providing enhanced user experiences (UX). As these technologies become cheaper and more accessible to the public, Virtual Reality (VR) and Augmented Reality (AR) have the potential to create new business opportunities, while increasing customer participation and improving the overall user experience. Providing a realistic customer experience is becoming a trend, but providing experience alone, is not enough to outperform the competition. Now is the time to go even further than providing a feeling of real-life immersion for the audience! Immersion means that the experience is relatively concrete and connects with the visible content to create a sense of real presence, using both virtual reality and augmented reality technologies to create new experiential content (Emerging Markets Information Journal, 2023).

The development and application of Virtual Reality (VR) technology in many industries is accelerating, and how it affects customer purchase behavior and customer experience is one of today's the most important research issues. New technologies will impact the way consumers search for products and brands, evaluate alternatives, make choices and consume products and brands, and improve the customer relationship management process. Despite the accelerating development and utilization of these technologies in many industries, academic research on how these technologies affect and change the customer experience is scarce (Hoyer, Kroschke, Schmitt, Kraume, & Shankar, 2020), and one of the most important research topics today, in particular, is how these technologies affect customer buying behavior and customer experience.

Since VR is a total simulation of the environment, it shuts out the real world. VR utilizes wearable devices (usually head-mounted displays) to block out "real world" sensory experiences and immerses users in virtual, often entertaining, 3D worlds (e.g., virtual video games), thereby providing a more engaging and innovative environment. Users of VR devices can interact and physically move in real time in the virtual world,

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usually through head movements, but possibly also through motion tracking of limbs. However, in this regard, VR headgear is not very comfortable and its visualization effects are not entirely credible (LaMotte, 2017). For example, users often experience headaches and nausea after a short period of use. In addition, stumbles and eye fatigue present a high health risk. Also, VR seems to be hampered by the lack of devices that produce good projection effects without compromising a consumer's sense of well-being when using the device. Furthermore, VR technology is likely to provide relevant new information and imagination quickly and easily before, during, and after a consumer's purchase. It also has the potential to revolutionize the imagination of product trials, product use, and the entire consumer experience. In particular, these technologies can provide consumers with an omnichannel experience across a variety of online and offline touchpoints (Hilken, Heller, Chylinski, Keeling, Mahr & de Ruyter, 2018).

According to McColl-Kennedy, Gustafsson, Jaakkola, Klaus, Radnor, Perks & Friman (2015), the customer experience usually consists of: (1) customer journey; and (2) experiential dimensions. The former (customer journey) is iterative and dynamic, including multiple touchpoints and multiple channels or environments. The key aspects of effective customer journey design are thematic cohesion, consistency, and context sensitivity of touchpoints (Kuehnl, Jozic & Homburg, 2019). In addition, consumers are increasingly connected, informed, empowered and active in seeking and creating their own experiences or in co-creating experiences with companies (Prahalad & Ramaswamy, 2004). An alternative approach to the latter (experiential dimensions) study explores the internal and subjective experiential dimensions evoked by these touchpoints for the so-called "brand experience". Brand experience is defined as "the subjective, internal consumer responses (sensations, feelings, and perceptions) and behavioral responses elicited by brand-related stimuli that are part of a brand's design and identity, packaging, communication, and environment" (Brakus, Schmitt & Zarantonello, 2009). We will argue that as brand-related stimuli, technology can evoke different experiential dimensions, thereby creating experiential value.

Next, a new conceptualization of how the role of new technologies affects customer journey and experience value. Based on customer experience literature, we conceptualize the role of new technologies as affecting the customer/shopper journey and experiential value. The first aspect of our conceptualization is about what technology is going to enable users to do in the customer journey; the second aspect is about what new experiential value may be created and how companies can enhance that value creation.

Customer/Shopper Journey

Based on Lemon & Verhoef's (2016) customer journey model and shopper journey model, we conceptualized the customer journey as a transaction cycle covering three stages: pre-transaction/purchase, transaction/purchase, and post-transaction/purchase. Breaking down the customer/shopper journey into proposed stages is critical to identifying the unique role that each technology may play. The concept of the customer/shopper moving from information gathering and searching to buying and ultimately evaluating the purchase is well established not only in customer experience management, but also in customer management and multi-channel customer management.

To summarize, the scope of this study is to interview college students in southern Taiwan, who have experienced virtual reality. Purposive Sampling was adopted to conduct the sampling of the population, and the sample questionnaires were archived. Since this study falls under the category of Confirmatory Factory Analysis (CFA), the Linear Structural Equation Molding (SEM) operation and analysis established in this study were performed using Amos software. The primary objective of this study is to verify the impact of virtual reality marketing on customer purchase behavior, using customer experience as a moderator. In other words, the specific objectives of this study are as follows:

1. To understand whether the VR-incorporated marketing approach has a positive and significant impact on the customer experience;

2. To understand whether customer experience has a positive and significant impact on the customer purchase behavior; and

3. To understand whether the VR- and customer experience- incorporated marketing approach has a positive and significant interaction effect on customer purchase behavior.

II. LITERATURE REVIEW AND HYPOTHESIS DERIVATION
2.1 Virtual Reality (VR)

It can stimulate the imagination of consumers to go beyond the physical, and then upgrade and enrich consumption (Hoyer et al, 2020). The conceptual definition of Virtual Reality (VR) in this study is that VR utilizes wearable devices (usually head-mounted display) to block out "real world" sensory experiences and immerse users in virtual, often entertaining, 3D worlds (e.g., virtual video games), thereby providing a more engaging and innovative environment. The above definition is derived from following literature.

Virtual Reality (VR) is not a new technology. Early computerized VR began in the late 1960s (VRS 2016), but it was not until the 1980s that the name was coined. At the same time, head-mounted displays and

tactile gloves connected to computers were commercially released to simulate 3D environments within our surround stereoscopic vision (Barnes, 2016).

LaMotte (2017) indicates that Users of VR devices can interact and physically move in real time in the virtual world, usually through head movements, but possibly also through motion tracking of limbs. However, in this regard, VR headgear is not yet comfortable enough and its effects are not entirely credible.

Morris (2016) compares the development of VR today to that of social media before it became mainstream in 2008.

Bright Ng (2022) points out that VR is a newly developed practical technology that uses computer simulation to generate a three-dimensional space, providing users with a visual sensory experience that allows them to observe things in their environment in real time and without limitations. The three major building blocks in VR are the three "I's": Immersion, Interaction and Imagination.

2.2 Customer Experience

The conceptual definition of customer experience in this study is: "The study of customer experience as classified by various experiences and dimensions." To verify the role of new technologies in value creation, the three dimensions that distinguish useful customer experiential value are (1) cognitive value, (2) sensory/emotional value, and (3) social value. Cognitive value is the experiential value that consumers acquire during the information processing and decision making process. Sensory/emotional value includes the value consumers draw from sensory stimuli and emotional attachments. Lastly, social value includes the value consumers receive as a result of connecting to the social world around them through AI-enabled behaviors and relationships.

As for the customer experience dimension, Hoyer et al. (2020) suggest that it usually consists of: (1) customer journey; and (2) experiential dimension. This study adopts the above two dimensions as the sub-dimensions of customer experience. The research of Klaus & Maklan (2013) indicates that four latent variables such as customer experience, loyalty intention, customer satisfaction, and word-of-mouth behavior are interrelated.

2.3 Purchase Behavior

The conceptual definition of purchase behavior in this study is drawn from the research of Yuan (2006), "the likelihood that a consumer intends to purchase a particular product."

Chaudhuri & Holbrook (2001) suggest that brands have traditionally played a key role in the consumer decision making process, as they become familiar and trusted. A key goal for marketers is to establish a strong connection with consumers. When such a situation occurs, consumers develop a strong commitment and loyalty to the brand.

According to Yuan (2006), purchase intention is defined as the probability that a consumer intends to purchase a particular product. Purchase intention has been proven to be a key predictor of consumer behavior, which is the subjective tendency of consumers to purchase the subject matter, and is considered to be a predictor of behavior. Therefore, for a long time it has been the practice that, purchase intent has been the most accurate predictor of customer purchase behavior for marketers.

2.4 Virtual Reality and Customer Experience

The research results of Chen (2019) show that immersion has a positive and significant effect on both customer experience and satisfaction, while customer experience also has a positive and significant effect on satisfaction, and that satisfaction, also has a positive and significant effect on the intention of continued use.

The research results of Chen & Liang (2020) show that the exercise bike, whether with the addition of virtual reality technology or with the score ranking of the game mechanism, will provide a better customer experience than the general exercise bikes currently on the market.

The proposal, made by Flavián, Ibáñez-Sánchez & Orús (2019), classifies technological devices according to their degree of embodiment, that is the degree of contact with the senses: internal devices, which are fitted into the human body (wearables and implanted devices) and external devices, which are unintegrated in the human body (stationary and portable external devices). Technological embodiment includes two important factors as discussed in the ICT literature: immersion (Biocca, 1997; Shin, 2017) and sensory stimulation. (Tussyadiah, 2014). The higher level of technological embodiment creates a sense of intimacy between the technology and the senses, and generates a more immersive experience. Companies must consider the extent to which the technology may be incorporated into the customer experience. Based on the information above, the following hypotheses are proposed in this study:

Hypothesis (H_1): the VR-incorporated marketing approach has a positive and significant impact on the customer experience.

2.5 The Relationship Between Virtual Reality, Customer Experience and Purchase Behavior

The research of Chen & Liang (2020) classifies customer experience into four aspects: sensory experience, emotional experience, thinking experience, and action experience. The inclusion of virtual reality has a stronger effect on sensory experience, while the addition of gaming mechanisms will produce better results in the other three aspects. Therefore, combining these two technologies can create a better customer experience and a desire to continue using the bike, than that of existing conventional exercise bikes.

In some industries, due to a customer-oriented approach adopted by many companies, they are moving toward digital transformation and deeper connections with customers, which is particularly important in the current digital age. In using VR and AR technologies, companies can reach new consumers and target audiences by allowing consumers to visit virtual stores and virtual showrooms, while trying on clothes and viewing products online without leaving their homes, thereby strengthening this connection with their target customer base. In addition, this type of service helps to collect information about consumer reactions and interactions with the product. The analysis of these data points allows for a better understanding of consumers and their preferences, and helps to provide further improvement of customer service. Specifically designed VR and AR marketing can help increase brand loyalty and attract potential customers (Emerging Markets Information Journal, 2023).

To date, the literature on the causal relationship of the three major latent constructs, i.e., virtual reality, customer experience, and purchase behavior, is scarce. In order to make this study more rigorous, a questionnaire was developed, based on the sub-constructs or observable constructs of the potential/unobservable constructs of virtual reality and customer experience and purchase behavior, and the following hypotheses were proposed.

Hypothesis (H_2): The VR and customer experience incorporated marketing approach has a positive and significant interaction effect on customer purchase behavior.

2.6 Virtual Reality and Customer Purchase Behavior

Virtual reality marketing enables a more direct and clearer presentation of products to customers. Virtual reality allows customers to see products in an unrestricted, 360-degree comprehensive view that traditional product introductions, product pictures, and product videos cannot provide.

According to the findings of Kong, Liu & Min (2020), the most direct influence factors of virtual reality technology on the operation of the strategic marketing model are the immersion, conception and customer buying behaviors of sudden industry development. Therefore, this study aims to develop a questionnaire and propose the following hypotheses, based on observable constructs of the potential constructs, such as virtual reality and customer purchase behavior:

The research analysis of Wang (2022) reveals that: experiential value has a significant positive impact on customer satisfaction; experiential value has a significant positive impact on customer loyalty; customer satisfaction has a significant positive impact on customer loyalty.

To summarize the above, this study aims to develop a questionnaire and propose the following hypotheses, based on observable constructs of the potential constructs, such as virtual reality and customer purchase behavior:

Hypothesis (H_3): The VR-incorporated marketing approach has a positive and significant impact on the customer purchase behavior.

III. RESEARCH METHOD

Based on the above research motives, purpose and literature review, this study deducted research hypotheses, and constructed a conceptual research framework of this research model, as shown in Figures 1.1 and 1.2.
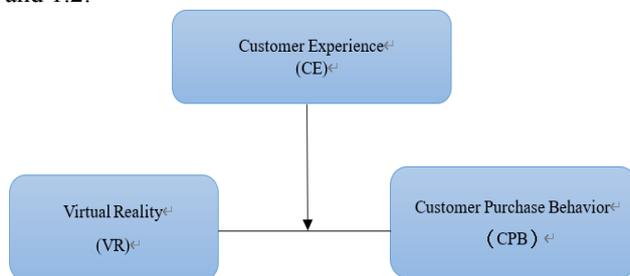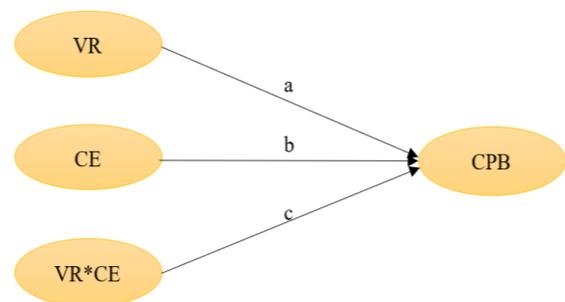

Figure 1.1 Research framework

Figure 1.2 Research framework

3.2 Questionnaire Design

The questions in the questionnaire for this study were developed based on the observable constructs of the potential / unobservable constructs of the established model (fig. 1) mentioned above, then the "Itemization Measurement" method, based on observable constructs, was adopted to proceed. The questionnaire was measured on a 7-point Likert scale, with scores ranging from 7 to 1 depending on the degree of agreement and disagreement. The answers were measured with 7 denoting Strongly Agree and 1 denoting Strongly Disagree. A higher score represents a greater level of agreement, and vice versa.

3.3 Sampling Method

In this study, Purposive Sampling was used to sample the population. The scope of this study is to interview college students in the south, who have experienced virtual reality, and the sample questionnaires were archived. Since this study falls under the category of Confirmatory Factory Analysis (CFA), we intend to use Amos software for the operation of Linear Structural Equation Molding (SEM). In this study, 10 expert questionnaires were distributed as a pilot-test, and then a post-test was conducted according to the improvement suggestions made by the experts, and 30 questionnaires were officially proposed to be distributed.

3.4 Questionnaire Data and Measurement System

In order to validate the research framework proposed by this research, the Linear Structural Equation Modeling (SEM) is used to perform Confirmatory Factor Analysis (CFA) on the research model framework. This study's questionnaire is design on three latent variables i.e., Virtual Reality, Customer Experience and Purchase Behavior, each of which was divided into observable/explicit variables containing several questions to survey. After collating the collected data, the study created a SPSS primary file. For the construction of this study's measurement system, Table 1 shows the number of questions under each implicit or explicit variable, as well as the referential sources.

Table 1 Number of Questions under each 'Implicit Variable' and 'Explicit Variable'

Implicit Variables	Explicit Variables	Number of Questions	Questionnaire Reference
Virtual Reality (VR)	Marketing Approach of Virtual Reality (VR_1)	3	Liu (2021)
	Feelings of Virtual Reality (VR_2)	3	
Customer Experience (CE)	Customer Journey (CE_1)	3	Hoyer et al(2020)
	Experiential Dimensions (CE_2)	3	
Customer Purchase Behavior (CPB)	Purchase Intention (PCB_1)	2	Yuan (2006)
	Opinion Leader (PCB_2)	2	
	Brand Awareness (PCB_3)	2	

Source: this study

3.5 Linear Structural Equation Modeling (SEM)

Confirmatory Factor Analysis (CFA) is an analysis technique in contrast with Exploratory Factor Analysis (EFA). This study includes a CFA, on the three unobservable/latent variables of Virtual Reality, Customer Experience and Purchase Behavior. SEM is made up of structural and measurement models to efficiently tackle the cause-effect relations among implicit/latent variables. The three parts of model-testing in this study are: (1) goodness-of-fit of the measurement model; (2) goodness-of-fit of the structural model; (3) the overall model's conformity with goodness-of-fit indicators. In other words, goodness-of-fit indictors were applied to a test of the overall goodness-of-fit effect of SEM (Diamantopoulos & Siguaw, 2000).

3.6 Fit Analysis of Measurement Model

To a large extent, factor loading of each latent/implicit variable and manifest/ explicit variable is intended to measure the intensity of linear correlation between each explicit and implicit variable. The closer the factor loading is to 1, the better an observable variable is in measuring latent variables. The Average Variance Extracted (AVE), on the other hand, gauges an unobservable/implicit variable's explanatory power of variance with regard to an observable one, with the AVE value growing in proportion to the reliability and convergent validity of that particular implicit/latent variable. As a rule, AVE must be larger than 0.5 (Diamantopoulos & Siguaw, 2000).

IV.   RESEARCH RESULTS AND ANALYSIS

The factor loading of each of the observable variables in this study ranges from 0.8 to 0.9, which indicates that it has good reliability. In addition, the AVEs of this study are greater than 0.5, which indicates that the Explicit Variables have high reliability and convergent validity (Table 2 and Figure 2).

Table 2 Judgment Indicators for the Measurement Model

Implicit Variables	Explicit Variables	Factor loading	Average Variance Extracted, AVE
Virtual Reality (VR)	Marketing Approach of Virtual Reality (VR$_1$)	.831	.530
	Feelings of Virtual Reality (VR$_2$)	.812	.514
Customer Experience (CE)	Customer Journey (CE$_1$)	.851	.561
	Experiential Dimensions (CE$_2$)	.812	.514
Customer Purchase Behavior (CPB)	Purchase Intention (CPB$_1$)	.841	.552
	Opinion Leader (CPB$_2$)	.820	.520

Source: this study

4.2 Fit Analysis of Structural Model
4.2.1 Path analysis results of structural model

After the overall model passed the fitness test, the Parameter Estimates between the implicit variables, and the Standard Error (S.E.) and Critical Ratio (C.R.) between the latent variables are shown in Table 3. In addition, in Table 6, since c = 0.671, that is, a company can achieve a multiplicative effect of synergy by adopting a good virtual reality practice on customer purchase behavior, while also taking into account of increasing company's customer experience.

Table 5 Un-standardized Path Analysis Results of the Structural Model

Path Coefficients between Implicit Variables			Estimate	S.E.	C.R.	P	Label
Virtual Reality(VR)	→	Customer Purchase Behavior (CPB)	.931	.493	1.888	-	a
Customer Experience (CE)	→	Customer Purchase Behavior (CPB)	1.534	.371	4.135	***	b
VR*CE	→	Customer Purchase Behavior (CPB)	1.824	.382	4.775	***	c

Note: * indicates P<0.05; ** indicates P<0.01; *** indicates P<0.001

Table 6 Standardized Path Analysis Results of the Structural Model

Path Coefficients between Implicit Variables			Estimate
Virtual Reality(VR)	→	Customer Purchase Behavior (CPB)	.251
Customer Experience (CE)	→	Customer Purchase Behavior (CPB)	.433***
VR*CE	→	Customer Purchase Behavior (CPB)	.617***

Note: * indicates P<0.05; ** indicates P<0.01; *** indicates P<0.001

4.4 Indices of Goodness-of-Fit of the Overall Model

The purpose of adopting SEM in the modeling phase of this study is to explore how unobservable variables are interconnected within the structural model, to determine if the measurement model has measurement reliability, and also to measure this paper's overall goodness-of-fit effect using such indices as χ^2, d.f., GFI, AGFI, NFI, CFI, RMR and RMSEA. In most cases, it is required that χ^2/d.f. <5, 1>GFI>0.9, 1>NFI>0.9, 1>CFI>0.9, RMR<0.05 and RMSEA<0.05 (Bagozzi & Yi, 1988). In summary, the overall goodness of fit of the group model in this paper is χ^2/df <5. Since GFI, AGFI, and NFI are all greater than 0.90, and the RMR value is less than 0.05, it indicates that the overall fit of this paper model is good (goodness-of- fit), as shown in Table 7.

Table 7 The Goodness-of-Fit Evaluation Table of the Overall Model

Determination index	χ^2	DF	GFI	AGFI	NFI	CFI	RMR	RMSEA
Fit value	135.19	96	0.901	0.895	0.902	0.904	0.001	0.001

Sources: this study

4.5 Standardized Results of SEM Analysis

The computerized standardized results of the overall framework are shown in Figure 2.
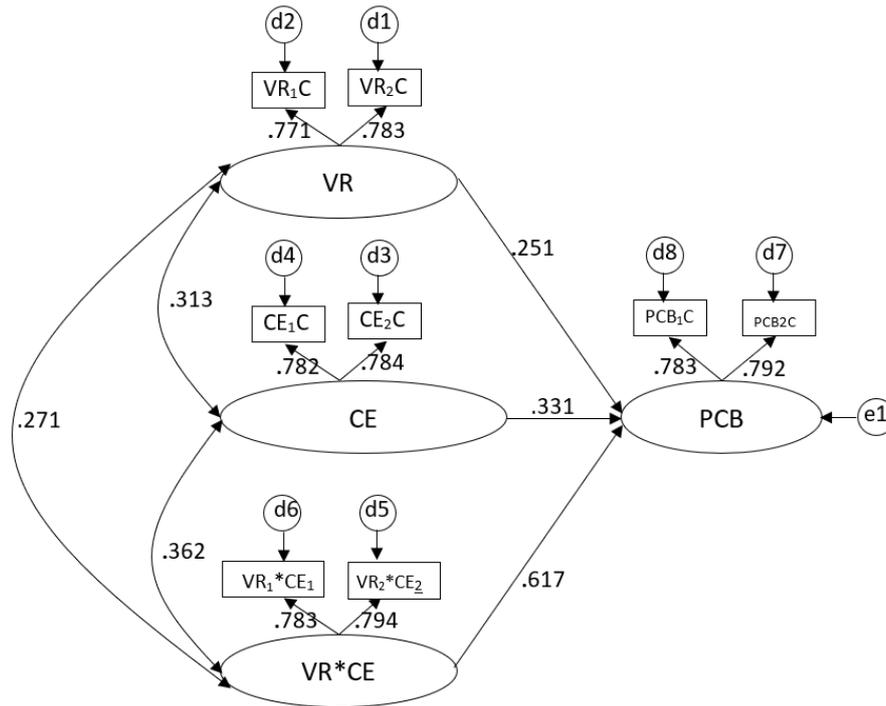

Figure 2   Standardized results of SEM analysis

4.6 Path Effect Analysis & Tests of Structural Model

In this study, Hierarchical Regression (Table 8) was performed first to test the moderating variables. Then, the regression analysis and t-test of the centralized PCB on VR, CE, and VR*CE were performed to check whether the significance of the bias regression coefficient c was valid (i.e., whether c was equal to zero), as shown in Table 9.

Table 8 Coefficients[a]   (Hierarchical Regression)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.88[a]	.77	.75	.43	.02	136.42	2	96	.00
2	.89[b]	.79	.76	.38	.03	18.23	1	96	.00

a. Predictors: (Constant), VR and CE
b. Predictors: (Constant), VR, CE and VR*CE

Table 9 Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta			
1 (Constant)	3.817	.881	.453		3.254	.001
VR	1.754	.502	.481		1.494	-.
CE	1.885	.321	.296		5.872	.001
2 (Constant)	2.036	.561	.451		3.629	.001
VR	1.197	.125	.251		1.888	-.
CE	1.373	.136	.331		4.135	.001
VR*CE	3.407	.531	.617		4.755	.002

a. Dependent Variable: Customer Purchase Behavior (CPB)

Figure 2 indicates that the path coefficient of VR*CE to PCB is c = 0.617, in which it is not equal to zero, so CE is the moderating variable of the model established in this study, and VR*CE has an interactive effect on PCB.

Based on the above analysis, this study yielded the following verified results, showing that:

(1) The VR incorporated marketing approach has a positive but insignificant effect on customer experience (CE); the standardized path coefficient is 0.251, so the hypothesis H_1 is supported. (The hypothesis is partially substantiated).

(2) Customer experience (CE) has a positive and significant effect on customer purchase behavior (CPB) with a standardized path coefficient of 0.331, so Hypothesis H_2 is supported. (The hypothesis is substantiated);

(3) VR incorporation and customer experience (CE) also has a positive and significant interactive effect on customer purchase behavior (CPB) with a standardized path coefficient of 0.617, so hypothesis H_3 is supported. (The hypothesis is substantiated).

V. CONCLUSION AND SUGGESTIONS

5.1 Conclusions
From an analysis of the above data, the following conclusions are reached:

(1) In terms of SEM's model verification:

The linear structural equation modeling (SEM) constructed in this study and its Measurement Model, Structural Model and the overall structure have a good fit-of-goodness, which indicates that the model fits well.

(2) In terms of the practical tests

VR incorporation and Customer Experience (CE) has a positive and significant interactive effect on customer purchase behavior (CPB). In other words, the "Customer Experience (CE)" variable in this study has a positive moderating effect. In this study, we emphasize that when the moderating variable and the independent variable have significant interactive effects on the dependent variable simultaneously, the effect of the independent variable on the dependent variable, or the moderating variable on the dependent variable, is less meaningful (Chen, 2010).

5.2 Research Contribution of this Study
(1) In terms of practical aspects:

In this study, we synthesize the relevant constructs of earlier studies to build a model and conduct verification to understand whether the model has good fit-of-goodness effects. Therefore, the topic of this study falls under the important practical topic of Confirmatory Factor Analysis (CFA), which is worthy of further research in this field by subsequent researchers, and the research results can be used as a reference for the industry.

(2) The topic of this study and the application of the research method are relatively important and novel, respectively.

Reviewing the past literature, most of the studies applied multi-regression analysis for exploratory research, and not many studies considered the moderating effect of implicit variables for confirmatory factor analysis. As the main construct of this study is unobservable variables, it is more appropriate to use CFA and Linear Structural Equation Modeling (SEM) as the measurement tool and modeling framework of this study, respectively. Therefore, the research topic and the application of the research method are important and novel, respectively.

5.3 Research Limitation and Recommendations
This study is a "one cause, one effect, one moderator" model, and is limited to the confirmatory factor analysis (CFA) of college students in southern Taiwan, who have experienced virtual reality, as interviewees. Subsequent researchers may consider verifying a variety of industries or latent constructs to compare whether there are differences in the fit-of-goodness of various industries under the same model or different models.

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